P R O P O S A L

CONTRACT, BOND AND SPECIFICATIONS

FOR

CONSTRUCTION OF SUPERSTRUCTURE AND INSTALLATION OF PIPE AND EQUIPMENT FOR FILTRATION PLANT AND PUMPING STATIONS

FOR

THE CITY OF ATHENS, GA.

A. G. DUDLEY, MAYOR

J. G. BEACHAM, CITY ENGINEER

WIEDEMAN AND SINGLETON

CONSULTING ENGINEERS

ATLANTA, GEORGIA

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NOTICE TO CONTRACTORS

Sealed proposals will be received by the Mayor and Council of Athens, Georgia, at the City Hall, Athens, Georgia, until October 10th, 2 P.M. E S T, and at that time publicly opened, for the construction of superstructure and the installation of pipes and equipment for a filtration plant and pumping stations.

Plans and specifications are on file at the office of the City Engineer and with Wiedeman & Singleton, Engineers, Atlanta, Georgia, where they may be inspected. Applications for plans may be made to Wiedeman & Singleton, Engineers, by contractors, or their authorized representatives. Applications must be accompanied by a deposit of Twenty-five ($25.00) dollars, fifteen ($15.00) dollars of which will be returned upon return of the documents within thirty days after the opening of bids, or upon submission of a bona fide bid.

The contractor, and all subcontractors, shall pay not less than the minimum hourly wages prescribed by the rules and regulations of the Public Works Administration.

A certified check, or bidders bond, for not less than 5 per cent of the bid, made payable to the City of Athens, Georgia, must accompany each bid as an evidence of good faith. The successful bidder must furnish a performance bond for 100% of the contract price, conditioned upon the payment of all persons supplying labor and furnishing materials for the construction of the Project.

Contractor's financial statement, record of experience, and list of equipment, shall be filed with the contractor's proposal, provided they have not been filed with the State Director, PWA, during the preceding three months.

Contracts will not be awarded until bids have been examined and approved by the State Director, PWA.

The right to reject any or all bids is reserved. No Bidder may withdraw his bid for a period of thirty days after date set for opening thereof.

A. G. DUDLEY, MAYOR

ATHENS, GEORGIA

INSTRUCTIONS TO BIDDERS

How Let: The work is divided into a general contract and an equipment contract but bidders may bid on one or both sections.

Blanks: All bids must be made upon the blanks hereto annexed and shall state, in figures and in writing, the amount bid for each section and item as shown, and all proposals must be for materials and work called for in the specifications.

Bids: The bids are to be enclosed in a sealed envelope, addressed to the Mayor and Council, Athens, Georgia, and marked "Proposals for Filtration Plant Construction".

Each bid must be accompanied by a certified check, or bidders bond, for an amount equal to 5 per cent of the amount of the bid, to guarantee that the successful bidder will, within ten (10) days from the date of notice of award of contract, enter into a contract with the City of Athens, hereinafter known as the Owner, for the performance of the work and execute a satisfactory surety bond in an amount equal to one hundred (100%) per cent of the contract price, for the full and faithful performance of the contract, in accordance with the plans and specifications. The surety bond must be written by a surety company acceptable to the Owner and the State Director, P. W. A. The proceeds of such checks, or bidders bonds, are to become the property of the Owner as liquidated damages, if, for any reason whatever, the bidder withdraws from the competition after opening of the bids, or refuses to execute the required contract and bond, if his bid is accepted.

Time Limit: The time set for the completion of the work shall be 180 calendar days after date of notification from the Engineer to the Contractor to proceed with the work. Such notification to be approved by the State Engineer P.W.A.

Return of Checks: Checks, or bidders bonds, will be returned after the approval of the contract and bond executed by the successful bidder.

The Owner, at its discretion, may return such checks, or bidders bonds, as it may see fit before signing of the contract.

P.W.A. FORM 179, Rules and Regulations relating to applicants and projects under the Emergency Relief Appropriation, Act of 1935, applicable to grants, and Exhibits "A" and "B" are attached hereto and shall be considered a part of this contract.

Bids Opened in Public: Bidders are invited to be present at the opening of proposals.

Right to Reject Bids: The Owner reserves the right to reject any or all bids. It is distinctly understood, and all bids are made subject to this agreement, that the Owner reserves the right to decide which bid be deemed lowest and best, and, in arriving at this decision, due consideration will be given to the reputation of the bidder, his financial responsibility, work of this type successfully completed, and the character of material and machinery offered. No bids received after time set for opening proposals will be considered. Any unauthorized conditions, limitations,or provisos, attached to the proposal, or the omission of a bid on any item in the proposal for the section bid upon, will render it informal and may cause its rejection.

No bids will be allowed to be withdrawn. Unbalanced bids will be subject to rejection.

Proposal: The lump sum bid for each section or item shall be for furnishing all equipment, materials and labor for completing the section or item, as per plans and specifications.

Should it be found that quantities or amounts shown on the plans or in the proposal, for any part of the work, are exceeded or should they be found to be less, after the actual construction of the work, the amount bid for each section or item will be increased or decreased in direct proportion to the change in quantities or amounts, at the unit prices bid for the listed individual items.

Where a lump sum is bid for a section, the sum total of the various items under that section is not intended, when totaled, to be equal to the sum bid for the first item listed under the section, Not all of the materials or work are listed for individual item bids, but they shall be included in the price bid for the first item listed under the section.

P R O P O S A L

FOR

CONSTRUCTION OF SUPERSTRUCTURES AND INSTALLATION
OF PIPE AND EQUIPMENT FOR FILTRATION PLANT AND
CONSTRUCTION OF PUMPING STATIONS

FOR

THE CITY OF ATHENS, GEORGIA

To the Mayor and Council

Athens, Georgia

Dear Sirs:

The undersigned, as bidder, hereby declares that the only persons, company or parties interested in this proposal as principals, are named herein; that he has carefully examined and fully understands the contract, plans and specifications hereto attached, and has made a personal examination of the site of the proposed work and the character of material to be encountered; and has satisfied himself as to the actual conditions and requirements of the work; and that he hereby proposes and agrees that, if his proposal is accepted, he will contract with the Mayor and Council of the City of Athens, Georgia, in the form of contract hereto attached, to furnish all necessary machinery, tools, apparatus, and other means of construction, and all materials and labor necessary to construct and complete the work specified under the following items, and in the contract, and called for by the plans, in the manner specified and in the time mentioned, according to the requirements of the Mayor and Council as hereinafter set forth, for the following prices, each price to include all cost incidental to the work to which it applies, to-wit:

S E C T I O N 1

ITEM 1: For furnishing all materials and constructing the work specified under this section, complete in accordance with the plans and specifications, the lump sum of _____ Dollars, $_____

ITEM 2: For rock excavation in sewer trenches.

1500 units @ _____ Dollars, $_____ per unit

Total _____ Dollars, $_____

(To be included in lump sum)

ITEM 3: For concrete in excess of or less than that shown on plans, the sum of _____ Dollars, $_____ per cubic yard

ITEM 4: For reinforcing steel in excess of or less than that shown on plans, the sum of _____ Cents $_____ per lb.

ITEM 5: For rock excavation at the river pumping station in excess of or less than that shown on plans, the sum of _____ Dollars, $_____ per cubic yard

ITEM 6: For common brick in place, in excess of or less than that shown on plans _____ Dollars, $_____ per M

ITEM 7: For face brick in place, in excess of or less than that shown on plans _____ Dollars, $_____ per M

S E C T I O N 2

ITEM 8: For furnishing all materials and installing all equipment specified under this section and shown on plans, the lump sum of _____ _____ Dollars, $_____

ITEM 9: For furnishing all materials and constructing pipe lines outside the structures, including all earth excavation and backfill, complete, tested and ready for operation but not including rock excavation -

With pipe purchased from Owner

569 ft. 20" Class 100 @ _____ per ft. Total $_____

1104 ft. 16" Class 100 @ _____ per ft. Total $_____

298 ft. 12" Class E @ _____ per ft. Total $_____

With pipe purchased from Manufacturers

36 ft. 36" Class 150 @ _____ per ft. Total $_____

40 ft. 24" Class 100 @ _____ per ft. Total $_____

160 ft. 24" Class 150 @ _____ per ft. Total $_____

568 ft. 20" Class 100 @ Rew _____ per ft. Total $_____

600 ft. 20" Class 150 @ _____ per ft. Total $_____

63 ft. 16" Class 100 @ _____ per ft. Total $_____

66 ft. 10" Class 100 @ _____ per ft. Total $_____

104 ft. 6" Class 100 @ _____ per ft. Total $_____

127 ft. 6" Class 150 @ _____ per ft. Total $_____

76 ft. 4" Class 150 @ _____ per ft. Total $_____

40 ft. 2" Class 150 @ _____ per ft. Total $_____

(Include in lump sum)

NOTE: All valves, hydrants, air valves to be included in lump sum.

ITEM 10: For furnishing and installing C. I. Fittings -

19 tons @ _____ Dollars, $_____ per ton

Total _____ Dollars, $_____

(Include in lump sum)

ITEM 11: For rock excavation in trenches -

5800 units @ _____ Dollars, $_____ per unit.

Total _____ Dollars, $_____

(Include in lump sum)

ITEM 12: For furnishing and installing pumping equipment, including suction connections and discharge valves and connections to main header as specified - 1 - 3000 G.P.M. gasoline engine driven high lift centrifugal pump, complete with all engine accessories, and gasoline tank the sum of _____ Dollars, $_____

Alternate - 1 - 2100 G.P.M. gasoline engine driven, high lift centrifugal pump complete with all engine accessories and gasoline tank the sum of _____ Dollars, $_____

1 - 2100 G.P.M. motor driven low lift centrifugal pump and starter, complete as specified, the sum of _____

Dollars, $_____.

1 - 2500 G.P.M. motor driven low lift centrifugal pump and starter, complete as specified, the sum of _____

Dollars, $_____.

1 - 1500 G.P.M. motor driven high lift centrifugal pump and starter, complete as specified, the sum of _____

Dollars, $_____.

1 - 300 G.P.M. motor driven wash water pump, complete as specified, the sum of _____ Dollars, $_____

(Include in lump sum)

If this proposal shall be accepted, the undersigned agrees to enter into and execute a contract, furnish the required bond, of which this proposal, the attached advertisement, the general and detail plans and specifications shall be made a part, for performing said work and supplying said material, at the prices named in this proposal, and to complete the work within .... calendar days from the date of notification from the Engineer to proceed with the work.

And the undersigned furthermore agrees that, in case of a failure on his part to execute said contract and bond within ten (10) days after the award of contract, the check accompanying his bid, and the money payable thereon, shall be paid into the funds of the Mayor and Council of Athens, Georgia; otherwise the check accompanying this proposal shall be returned to the undersigned.

Attached hereto is a certified check on the .... National Bank of..... for the sum of $.....according to conditions under "Instructions to Bidders", and provisions therein.

The full names and residences of persons or parties interested in the foregoing bid, as principals, are as follows:

.....

.....

.....

.....

.....

.....

Dated at.....day of.....1935

.....L.S.

.....L.S.

The bidder shall here state what work he has done of similar nature to that bid for, and give references that will afford the Mayor and Council opportunity to judge as to experience, skill, business standing, and financial ability.

.....

.....

.....

.....

.....

.....

.....

ARTICLE OF AGREEMENT

STATE OF)
COUNTY OF) ss:
CITY OF)

This agreement made and entered into this..... day of.....1935, by and between the Mayor and Council of the City of Athens, Georgia, party of the first part, hereinafter known as the Owner, and .....,..... party of the second part, hereinafter known as the Contractor.

WITNESSETH: That the said Contractor has agreed, and by these presents does agree, with the said Owner, for the consideration hereinbefore mentioned in his proposal and under the penalty expressed in a bond marked "Bond A", bearing even date with these presents, and hereto annexed, to furnish all equipment, tools, material, skill and labor of every description necessary to carry out and complete in a good, firm, substantial and workmanlike manner, the work specified in strict conformity with the drawings hereto attached, and the specifications hereinafter set forth, which drawings and specifications, together with the foregoing proposal made by the Contractor, this agreement, and "Bond A", shall all form essential parts of this agreement. The work under this agreement shall be commenced within twenty (20) days after signing the contract, and shall be completed and submitted for final acceptance within ..... calendar days after the date of notification by the Engineer to proceed with the work.

Time is of the essence of this contract, and the Contractor shall pay to the Owner, not as a penalty, but as liquidated damages, the sum of twenty-five ($25.00) Dollars for each calendar day that he shall be in default of completing the work within the time limit named herein, because of the fact

that it is difficult to fix the damages, suffered by the Owner on account of such default, therefore liquidated damages are herein agreed upon as stated.

The Owner shall pay and the Contractor shall receive, the prices stipulated in the proposal hereto attached as full compensation for everything furnished and done by the Contractor under this contract. The contract prices shall also pay for all loss or damage arising out of the nature of the work aforesaid, or from the action of the elements or from unforeseen obstructions or difficulties encountered in the prosecution of the work, and for all expenses incurred by, or in consequence of the work, the suspension or discontinuance of the work, as herein specified, and for well and faithfully completing the work and the whole thereof, as herein provided, and for making repairs to and maintaining the work in good condition until the final payment is made.

This contract is executed in triplicate, two copies to remain in the custody of the Owner and one in the custody of the party of the second part.

Witness the signature of the _____ by its _____ and the attesting of this contract by the signature of _____ and by the seal of said _____ affixed and attested by said _____ and the said party of the second part hath also hereunto set his (their or its) hand and seal, the day and year first written above.

MAYOR AND COUNCIL

THE CITY OF ATHENS, GEORGIA

(SEAL)
ATTEST:

By _____
MAYOR

_____

_____

_____

_____

Contractor

Signed and sealed
in the presence of

_____

_____

Approved as to form and correctness

_____

City Attorney

BOND "A"

FOR PERFORMANCE OF CONTRACT.

COUNTY OF.....)
) ss:
)
STATE OF.....)

KNOW ALL MEN BY THESE PRESENTS. That we .....
.....
as principal, and.....
....., as surety, are held and firmly bound unto the Mayor and Council of the City of Athens, Georgia, hereinafter known as the Owner, for the use of the said obligee and of all persons doing work or furnishing skill, tools, machinery or materials under or for the purpose of the contract hereinafter named, in the sum of .....
..... Dollars, lawful money of the United States of America, to be paid to the City of Athens, Georgia, for the use of the said obligee and of all persons doing work or furnishing skill, tools, machinery or materials under or for the purpose of the contract hereinafter named, for which payment, well and truly to be made, we bind ourselves, our successors and our several respective heirs, assigns, executors and administrators, jointly and severally, firmly by these presents.

SEALED WITH OUR SEALS AND DATED this the _____ day of _____ One Thousand Nine Hundred Thirty-Five.

WHEREAS, the above bounden _____ _____ by an instrument in writing, bearing even date with these presents, has contracted with the Owner to furnish all equipment, tools, materials, skill and labor for the construction of section_____ of the attached contract and specifications, under the terms of said contract, which contract is by reference made a part hereof:

NOW, THE CONDITION OF THIS OBLIGATION IS SUCH That if the said _____ shall complete the work provided for in said contract according to its terms, and shall save the obligee hereunder free from all costs and charges that may accrue on account of the doing of the work specified in the contract, and shall pay as they become due all just claims for work, tools, machinery, skill and materials furnished by persons under, or for the purpose of, such contract above mentioned, and shall comply with the laws appertaining to said contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

AND THE FURTHER CONDITION OF THIS OBLIGATION IS SUCH THAT if _____ the principal hereto, shall fully and faithfully perform the work in accordance with the terms of the annexed contract therefor and the plans and specifications therein referred to, and provide the materials therein provided for, and replace defective work or material for a period of one year after the completion of this contract, then this obligation to be void: otherwise they, _____

_____

as principal and _____ as surety, jointly and severally agree to pay to the Owner the difference between the sum to which the said _____, as Contractor, would be entitled on the completion of the contract, and that which the Owner may be obliged to pay for the completion of the work by contract, or otherwise, and pay any damage, direct or indirect or consequential, which said Owner may sustain on account of such work or on account of the failure of said Contractor to properly and in all things keep and execute the provisions of the contract.

And the said _____

principal, and _____

surety, hereby further bind themselves, their successors, assigns, heirs, executors and administrators, jointly and severally, that they will amply and fully protect the said Owner against, and will pay any and all amounts, damages, costs and judgments which may be recovered against, or which the said Owner may be called upon to pay, to any person or corporation by reason of any damages arising from the performance of said work, or of the repair or maintenance thereof, or the manner of doing same, or the neglect of said principal, or agents or servants, or the improper performance of the said work by the principal or agents or servants, or the infringement of any patent rights by reason of the use of any materials furnished or work done as aforesaid, or otherwise, and will also pay any damages for delay in performance within the time agreed, as stated in the contract.

And the said surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder, or the specifications accompanying the same, shall in any wise affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

This is to be construed as a statutory bond under the provisions of the Act of the General Assembly of Georgia. Approved August 19, 1916, Georgia Laws, 1916, page 94.

IN WITNESS WHEREOF, the said _____

has caused _____ corporate seal to be hereto affixed, and these presents to be signed in its _____

name by _____ L. S., and the said _____

as surety, has caused_____corporate seal to be hereto affixed and these presents to be signed in its name by_____

_____

_____

_____

_____

_____

Signed, sealed and delivered in the presence of:

_____

_____

GENERAL SPECIFICATIONS

Intention: It is intended that these specifications shall cover the completion of the work to which they relate.

Definitions: Where the following words, or the pronouns used in their stead, occur in this contract and these specifications, they shall have the following meaning.

Owner: Owner shall mean the Mayor and Council, City of Athens, Georgia, acting through their authorized and legal representatives.

Engineer: Engineer shall mean J. G. Beacham, City Engineer, and Wiedeman' and Singleton, Consulting Engineers, for the Owner or their duly authorized representatives.

Contractor: When the word "Contractor" is used, it shall be understood to refer to the party or parties of the second part to the foregoing agreement, contracting to perform the work to be done, and to furnish materials required under these general and detail specifications or the legal representatives of such party or parties.

Changes in Quantities: The quantities or materials and equipment indicated on the plans or specified are to be used as the basis for a lump sum proposal.

In the event that the quantities are increased, the Contractor will be paid for such additional quantities in excess of those shown on the plans at the prices for such work as contained in the proposal. If quantities are decreased, a deduction will be made in the same manner from the Contractor's compensation as bid for this class of work in the proposal.

Drawings: The character and location of the work, together with the essential details, are shown upon a set of drawings numbered from 1 to 12-A inclusive. These drawings and specifications form a part of this contract.

Should other working drawings be necessary to give further details, they will be furnished by the Engineer during the progress of the work. Where figures are given on the drawings, they shall take precedence over the dimen-

sions by scale.

Work to be Done.

The Contractor shall furnish all material, labor, appliances and tools necessary to complete the work awarded to him in accordance with the contract drawings. Should the Owner deem it necessary to modify the location, grade, number or size of structures and appurtenances, it reserves the right to do so, and the Contractor shall accept such modifications so ordered in writing by the Engineer and approved by the State Director P.W.A. These modifications shall not vitiate this contract. When any such changes are made, the Contractor shall receive equitable compensation, based upon the schedule of prices submitted and accepted in the proposal. Where such modifications call for a decrease in the cost of the work, a deduction will be made from the moneys due the Contractor. Where such modifications call for an increase in the cost of the work, said increase will be added to the amount due the Contractor.

No material modifications in the work, as shown by the plans and specifications, will be made without the nature and extent of such modification first being certified to by the Engineer in writing, and notice given to the Contractor.

In no case will any work in excess of the amount called for in the original contract and plans be paid for, unless so ordered in writing by the Engineer.

Work Divided into Sections.

The work to be performed under these specifications is divided into the following sections:

Section 1 - General Contract

Section 2 - Furnishing and installation of pipe and equipment.

No contractor shall have a claim for damages because of the failure of the contractor on the other section of the work to complete his contract

within the time limit specified, but such a contractor will be granted an extension of time equal to the delay occasioned by such failure.

CONTRACTORS BIDDING THE LUMP SUM FOR A SECTION ARE REQUIRED TO BID ALL ITEMS CALLED FOR UNDER THAT SECTION.

Lines and Grades.

The Engineer will furnish and lay out upon the ground a sufficient number of controlling lines and will establish bench marks in convenient locations near the work to enable the Contractor to lay out the necessary construction lines. All subsequent subsidiary lines and grades shall be laid out by the Contractor from the controlling lines and grades furnished by the Engineer or from measurements shown on the drawings. All lines and grades shall be subject to checking by the Engineer.

The Contractor shall provide such stakes, materials, and such labor and assistance as the Engineer may require in laying out work, establishing bench marks and checking and measuring the work.

Materials and Workmanship.

It is the intent of the specifications to describe definitely and fully the character and workmanship required with regard to all ordinary features and to require first-class work in all particulars. For any unexpected features arising during the progress of the work, and not fully covered herein, the specifications shall be interpreted by the Engineer to require first-class work; and such interpretation shall be accepted by the Contractor.

Inspection.

All material furnished and work done will be inspected by the Engineer, and if not in accordance with the specifications and contract, they will be rejected and shall immediately be removed and other work done and materials furnished in accordance therewith. If the Contractor fails to remove the work and material as above ordered, within a reasonable time, then the Engineer shall have the right and authority to stop the Contractor and his work at once and to

supply men and material at the cost and expense of the Contractor, such expense to be deducted from any moneys then due, or to become due, to the Contractor from the Owner.

The Contractor shall furnish every reasonable facility for inspection, and is to notify the Engineer in time to inspect inaccessible work or materials before same is covered. Should the Contractor fail to do this, he is to furnish, if required, necessary opportunities and facilities for the inspection of such work after being covered and completed, and pay the cost of same.

The Owner and the Engineer shall, at all times, have access to the work for the purpose of inspection, and observing the progress and condition of the work.

Defective Work and Material

The inspection of the work shall not relieve the Contractor of any of his obligations to fulfill his contract as herein prescribed and defective work shall be made good, and unsuitable materials may be rejected, notwithstanding that such work and materials have been previously overlooked by the Engineer and accepted or estimated for payment. The failure of the Engineer to condemn improper materials or workmanship shall not be considered as a waiver of any defect which may be discovered later, or as preventing the Owner at any time subsequently from recovering damages for work actually defective. If the work, or any part thereof, shall be found defective before the final acceptance of the whole work, the Contractor shall forthwith make good such defect, in a manner satisfactory to the Engineer, and if any materials brought upon the ground for use in the work, or selected for the same, shall be condemned by the Engineer as unsuitable or not in conformity with the specifications, the Contractor shall forthwith remove such materials to a satisfactory distance from the vicinity of the work.

Instructions.

The Contractor must follow strictly and without delay all instructions

and orders given by the Engineer in the performance of his work. In the event of the Contractor's absence from his work, he must leave it in charge of a duly authorized representative to whom orders and instructions may be given. If he fails to do this, the Contractor will be held responsible for the proper carrying out of such orders and instructions as will be necessary for the Engineer to give any superintendent, foreman or other employe about the work.

Corrections.

Should any portions of the plans and specifications be obscure or in dispute, they shall be referred to the Engineer and he shall decide as to the true meaning and intent. He shall also have the right to correct any errors or omissions at any time when such corrections are necessary for the proper fulfillment of said plans and specifications.

Disagreement.

Should any disagreement or difference arise as to the estimates, quantities or classifications or as to the meaning of the drawings or specifications, on any point concerning the character, acceptability and nature of the several kinds of work, and materials and construction thereof, the decision of the Engineer shall be final and conclusive and binding upon all parties to the contract.

Weather.

During unseasonable weather all work must stop when such would be liable to be injured, and same must be suitably protected from possibility of injury.

Extra Work.

No extra work will be paid for or allowed unless the same was done upon the written order of the Engineer, approved by State Director P.W.A. Subject to this condition, extra work will be paid for according to the prices in the proposal schedule. Where prices for work are not included in the schedule, ten (10%) per cent advance upon the actual cost of labor and materials,

as determined by the Engineer, will be paid to the Contractor. All bills for extra work must be submitted on the first of the month following the completion of same.

Estimates: The Engineer, during the first week of each month, will make an approximate estimate of the value of the work done and of the materials delivered during the previous month, and the Contractor will be paid an amount equal to 90 per cent of the value of labor performed and materials delivered on or before the fifteenth (15th) of the month. P.W.A. provisions to govern as to payment for materials. The balance will be retained by the Owner until completion of the 30-day test period and final acceptance by the Engineer.

Right-of-Way: The necessary land for the construction of the work will be furnished by the Owner, and a definite area will be allocated to the Contractor for storage of material and equipment used in the construction of the work. All operations shall be confined to the assigned area.

The Owner will provide no right-of-way over other private property. The Contractor shall take every possible precaution to inconvenience as little as possible the owners or tenants of adjacent private property through which the rights-of-way are obtained. Public highways shall not be obstructed in such a way as to cut off traffic. The Contractor shall, at his own expense, repair any damage or injury to either public or private property during the progress of the work.

Sub-Contract: No part of the work shall be sub-let without the written consent of the Owner, approved by P.W.A. If such consent is obtained and any part of the work is sub-let, this action shall not relieve the Contractor from any part of his obligations under his contract with the Owner. The sub-contractor shall be bound by all requirements applying to the Contractor. The Owner shall have the right at any time to terminate said sub-contract, if the Engineer certifies that the sub-contractor has failed to perform the work in a satisfactory manner, in which case the Contractor shall at once complete the work which was sub-let.

Commencement of Work and Rates of Progress:

The Contractor shall begin on this contract after notification by the Engineer to proceed, and shall diligently prosecute the same so that it shall be fully completed within the number of calendar days from and after the date of notification to proceed stated in his proposal or contract.

Special P.W.A. notice bidders are required to inform themselves fully of the conditions relating to construction and labor under which the work will be or is now being performed, and the Contractor must employ, so far as possible, such methods and means in carrying out of his work as will not cause any interruption or interference with any other contractors.

Order of the Work. The prosecution, order or sequence of the work shall be subject to the approval and direction of the Engineer, which approval and direction, however, shall in no way affect the responsibility of the Contractor.

Delay in Completion. Time being of the essence of the contract and because of the fact that it is difficult to fix the damages which will be suffered by the Owner on account of delays, the Contractor agrees asfollows:

The Contractor shall pay to the Owner, from any moneys due, or to become due, to the Contractor under the provisions of this contract the sum of Twenty-five ($25.00) Dollars for each and every calendar day that he shall be in default in completing the work to be done hereunder, after the time fixed in the contract, which sum is hereby agreed upon, not as a penalty, but as liquidated damages which the Owner will suffer by reason of loss of interest, engineering and other costs. The permitting of the Contractor to proceed to complete the work, or any part of it, shall in no way operate as a waiver on the part of the Owner of any of its rights hereunder.

The Owner shall be fully authorized and empowered to deduct the amount of such default at any time, provided, however, that the Owner shall have the right at its discretion to extend the time for the completion of the work beyond the time stated in this proposal.

Abandonment.

If the Contractor shall abandon the work under his contract, or if at any time the Engineer shall be of the opinion, and shall so certify to the Owner that the Contractor is wilfully violating any of the conditions of the contract, or executing the same in bad faith, or that the conditions herein specified as to the rate of progress are not fulfilled, or that the work of any part is unnecessarily delayed, or this contract or any claim thereunder is assigned without the written consent of the Owner and the State Director, P.W.A. or as herein specified, then, at the option of the Owner, the contract may be declared null and void, the security may be forfeited and the materials delivered at and built into the work, and the animals, machinery, implements and tools of every description, which may be found at the location of the work, shall become the property of the Owner. The Owner may then, at its option, proceed to complete the work, either by day work or contract, and any and all damages and increased costs of the work to the Owner will be deducted from the funds retained by the Owner, and from any sum realized from the value of the material and equipment reverting to the Owner. If the contract is annulled, as per this provision, the Contractor shall not be entitled to any damages on account thereof, nor shall such an annullment affect the right of the Owner to recover from the Contractor or his bondsmen damages which may arise as the result or failure of the Contractor to carry out the terms of this contract.

Labor. The Contractor shall employ only competent and skilled men to do the work. Each Contractor shall have a competent superintendent or foreman present at all times when the work is in progress to receive orders and execute the work.

The Contractor shall, upon demand from the Engineer, immediately discharge or remove any superintendent, foreman or workman whom the Engineer may consider incompetent or undesirable, and shall not again re-employ him without the consent of the Engineer.

The Contractor, in the construction of the work, shall give preference to the employment of citizens of Athens, and if the citizens of Athens are not

available, shall give preference to the citizens of the State of Georgia. Attention is called to labor requirements under heading Construction Regulations.

Laws and Regulations. The Contractor shall keep himself fully informed of all laws and municipal ordinances and regulations in any manner affecting those engaged or employed in the work, or the materials used in the work, or in any way affecting the conduct of the work, and of all orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. If any discrepancy or inconsistency should be discovered in this contract, or in the drawings or specifications herein referred to, in relation to any such law, ordinance, regulation, order or decree, he shall forthwith report the same in writing to the Owner. He shall, at all times, himself observe and comply with all such existing and future laws, ordinances and regulations, and shall protect and indemnify the Owner and its agents against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order or decree, whether by himself or by his employees.

Assignment.

The Contractor shall keep the work under his personal control and shall not assign, by power of attorney or otherwise, the work, or any part thereof without the previous written consent of the Owner, and State Director, P.W.A., and shall not, either legally or equitably, assign any of the moneys payable under the agreement, or his claim thereto, unless by and with the like consent of the Owner and State Director P.W.A.

Prevention of and Indemnification for Accidents.

The Contractor shall, during the performance of the work, take all necessary precautions and place proper guards for the prevention of accidents; shall put up and keep at night suitable and sufficient lights and shall indemnify and save harmless the Owner, its officers and agents, from all damages and costs to which they may be put by reason of injury to the person or property of another, resulting from negligence or carelessness in the performance of the

work or in guarding the same, or from any improper materials, implements, or appliances used in its construction, or on account of any act or omission of the Contractor or his agents. The whole or as much of the moneys due under and by virtue of this contract as may be considered necessary by the Owner shall or may be retained by the Owner until all suits or claims for damages, as aforesaid, shall have been settled, and evidence to that effect furnished to the satisfaction of the Owner.

Responsibility of Contractor.

The Contractor shall take all responsibility for the work, shall bear all losses resulting to him on account of the amount or character of the work, or because the nature of the land in or on which the work is done is different from what was assumed or expected, or on account of the weather, floods, or other causes; and he shall assume the defense of, and indemnify and save harmless the Owner, and its officers and agents, from all claims of any kind arising from the performance of this contract.

The Contractor shall have no claim for damages for any injury to the work, materials, or equipment, due to or resulting from the action of the elements, except that in such case he shall receive an extension of time reasonably sufficient to make proper repairs and to replace work and material which has been destroyed or injured, all of which he shall replace in a satisfactory manner and at his own expense.

The price bid under each section shall include all cost of labor, tools, and material necessary for furnishing protective works, and removing same at the proper time before the final completion of the work, as well as making any repairs that may be necessary.

Contractor's Claim for Damage.

If the Contractor shall claim compensation from the Owner for any damage sustained by reason of the acts of the Owner or its agents, he shall, within five days after the sustaining of such damage, make a written statement

of the nature of the damage sustained, to the Owner.

Protective Works.

The Contractor shall furnish and install all necessary temporary works for the construction and protection of the structure during construction.

Sanitary Regulations.

Necessary sanitary conveniences for the use of the laborers on the work shall be erected and maintained by the Contractor, in such a manner and at such points as shall be approved by the Engineer. Their use shall be strictly enforced.

Shanties.

Should the Contractor build shanties or other structures for housing men, tools, machinery and supplies, they will be permitted only at approved places, and their surroundings shall be maintained at all times in a sanitary and satisfactory manner. On or before the completion of the work, all such structures shall be removed, together with all rubbish and trash, at the expense of the Contractor.

Evidence of Payment.

The Contractor shall furnish the Owner, whenever requested, with satisfactory evidence that all persons who have done work, or furnished materials under this agreement have been duly paid or satisfactorily secured. And in case such evidence is not furnished as aforesaid, such amount as may be necessary to meet the claim of such unsatisfied person may be retained from moneys due the Contractor under this contract, until the liabilities aforesaid shall be fully discharged.

Legal Address.

The Contractor shall file with the Owner his legal address, and in the event such address is changed he shall notify the Owner in writing.

The delivery to the Contractor at the last address filed with the Owner by the Contractor, or the deposit in the post office of any notice, letter

or other communication to the Contractor so addressed, shall be deemed sufficient service thereof upon the Contractor.

Liens.

Before the final acceptance of the work and payment of the percentage retained by the Owner, the Contractor shall furnish to the Owner proper and satisfactory evidence that all claims for labor and material employed or used in the construction of said work have been settled, and that no legal claims can be filed against the Owner for such labor or material.

Test.

Before the acceptance of the whole or any part of the plant, it shall be subjected to test to determine that it is satisfactory for the purpose intended, and in accordance with the plans and specifications, and before final acceptance the Owner will operate the completed work for a period of thirty (30) days. Final acceptance will be given upon the successful completion of the operating tests.

Cleaning Up.

Before the work is considered as complete, all rubbish and unused material due to or connected with the construction, must be removed and the premises left in a condition satisfactory to the Owner. Streets, curbs, crosswalks, pavements, sidewalks, fences and other public and private property disturbed or damaged shall be restored to their former condition, and final payment will be withheld until such work is finished.

Final Inspection.

Upon notice from the Contractor that his work is complete, the Engineer will make a final inspection and will notify the Contractor of all instances where his work fails to comply with the plans and specifications, as well as any defects he may discover. The Contractor shall immediately make such alterations as are necessary to make the work comply with the plans and specifications at his own expense and to the satisfaction of the Engineer.

Upon the completion of such repairs and the satisfactory completion of the operating test and after approved by Inspection Division P.W.A., the Engineer shall issue his certificate of final acceptance, but the issuance of this certificate shall not prevent the Owner from recovering damages at any subsequent time for work found to be defective.

Acceptance of Final Estimate.

The acceptance by the Contractor of the final estimate, shall operate as a release to the Owner for all claims and liabilities to the Contractor for all work done or materials furnished, or for any act of the Owner or their agents affecting the work.

DETAILED SPECIFICATIONS

Detailed Specifications:

The following specifications are grouped under the Section to which they are especially applicable. Where work or material of the same class is called for on more than one Section, the following specifications shall govern where appropriate and placing them under any Section does not restrict their application to another Section where appropriate.

SECTION No. 1

GENERAL CONTRACT: Construction of Superstructure of Filter Plant and River Pumping Station

The work to be done under this section consists in furnishing all materials and constructing the superstructure of the filtration plant, the substructure and superstructure of the river pumping station and the concrete work at Sandy Creek pumping station, including all brick work and concrete trim, windows and doors, all vitrified or concrete pipe drain lines and manholes, heating, lighting, painting, mill work and all other work incidental to the construction of the superstructure of the filtration plant and river pumping station.

All concrete work, except concrete at the river pumping stations and Sandy Creek pumping station, will be done by the Owner and all equipment, including power wiring, will be furnished and installed by the Contractor for Section 2.

The Contractor's attention is called to specifications for Section No. 2 for a clearer understanding of the work to be done and materials to be furnished by others.

Brickwork: The Contractor shall furnish all materials and construct the walls of the filter plant of brick. The exposed surfaces of the walls shall be constructed of face brick equal in all respects to samples on file at the offices

of the Engineers. All brick shall be whole, sound, hard, straight and uniform in size. Wall faces which receive plaster shall be constructed of hard burned common brick.

Culling Brick: All brick shall be culled and sorted upon delivery, by men furnished by the Contractor, and all rejected bricks shall be then immediately removed from the work and not again offered for inspection.

Brick Mortar: All brick shall be laid in mortar composed of one volume of stainless Puzzolen cement and two volumes of sand. No retempered mortar shall be used and no greater amount of mortar shall be prepared than is sufficient for immediate use.

The joints for all brick shall not exceed three-eights of an inch in thickness. The courses shall be laid so as to correspond exactly in height with the springing line of the arches over windows and doors, and with belt course, sills, etc., without any cutting or chipping of the brick. All exposed joints shall be carefully raked or struck, as may be required. The face brick shall be laid in plumb bond and tied with blind headers. The main body of the walls shall be laid in running bond, with every sixth course headers. All brick work shall be laid to line, shall be level, and the bonds shall be accurately preserved. The exterior facings of brick shall be carried up at the same time as the main walls and shall be securely tied to the main walls every fourth course by Morse wall ties, or equal. Each brick shall be soaked in water just before laying and shall be laid in a full and close joint of mortar on its bed; end and side at one operation. Care shall be taken to have every joint full of mortar. The walls shall be made solid and without any voids. Brick arches shall be laid where shown or where detailed or ordered.

Cutting, Fitting, Setting Steel Work and Other Materials: All cutting and fitting to make connections with other classes of work shall be promptly done by the Contractor, and he shall carefully set or build in all wall plates, columns, beams, arches or other iron work. He shall also carefully build in all electric

conduits, wooden grounds and other materials, equipment and fixtures as may be required.

Centers: Centers, templates or forms shall be provided where necessary. No center shall be drawn until the Engineer's approval is obtained and great care must be used to so strike centers as not to injure the work.

Protection of Work: Contractor shall carefully cover, box and protect all walls and work in bad weather. He shall place suitable boxing where the work is liable to injury and in the manner directed by the Engineer. Any damaged or unsatisfactory work must be promptly removed and replaced by the Contractor at his expense.

Cleaning: On completion of the building, the Contractor shall clean the faces of all walls not plastered, with diluted muriatic acid and water, carefully applied with a scrubbing brush. Any pointing up or other work necessary to place the walls in first-class condition, shall be done by the Contractor at the same time.

Cast Stone: The Contractor shall furnish and set all cast stone shown on plans. Standard Indiana limestone or Terra Cotta may be substituted at the option of the Contractor.

Surfaces Cast Stone shall be rubbed, brushed or acid treated on surfaces that will be exposed, to remove enough of the cast surface to expose the aggregates and produce a finish similar and equal to that obtained by sand rubbing. Patterns for enriched ornament shall be dressed to remove imperfections in the casting and to show a texture similar to the finish of the rest of the work.

All cast stone shall be composed of Portland Cement and hard, durable aggregates of such colors, sizes and proportions as to produce, when finished, the required color, character, texture and strength. Cast stone shall be reinforced with steel as necessary for safe handling and for its location in the wall. Setting loops or Lewis holes shall be provided as necessary for hoisting

purposes, but shall be concealed when the stone is set.

All cast stone shall simulate the color and general character of variegated gray and buff limestone. The use of color pigments shall be avoided where practicable. Pigments (when used) shall be pure mineral oxides and shall not exceed two (2%) per cent by weight of the Portland Cement used in the tinted portion of the cast stone. The use of surface waterproofing compounds is prohibited.

Specimens taken from material delivered on the site shall show a compressive strength of at least 5000 pounds per square inch for 2-inch cubes, and an absorption of not more than 7 per cent after drying to constant weight in a temperature of 77° C and immersing 24 hours in water for pieces weighing approximately 15 pounds each.

Shop Drawings: Jointing and setting drawings shall be submitted in triplicate for the approval of the Engineer before any of the work is executed.

Protection: Cast stone shall be so delivered, piled and handled at all times as to protect it from damage. If a piece is chipped or stained on the face, it shall be redressed or cleaned to remove all traces of such defects before it is set in place, or a new piece shall be furnished. Patching will not be permitted without the written consent of the Engineer and shall be done only with material and labor furnished by the cast stone producer.

Detailed Requirements: Beds and joints shall be full and square the full depth and shall be scored to within 1 inch of the face.

Holes and sinkages shall be provided for anchors, etc. Exposed surfaces shall be true and faces in the same plane shall be flush at the joints. Moldings and arrises shall be sharp, true and continuous at the joints. Joints shall be plumb and level and shall be 1/2 inch wide. No piece shall have less than 4-inch bed, unless otherwise shown on plans.

Mouldings or projections subject to pressure shall have seats on the upper surface to receive the weight of the work above; the outer edge of the

seat to be kept back to or near the line of the face of the wall to protect the outer edge of the stone.

Anchors, dowels, etc., shall be provided where necessary.

Mortar: Setting and pointing mortar shall be composed of one volume of non-staining cement and two volumes of sand.

Furring: All wall surfaces requiring plaster shall be furred with 3/4 inch channels, except interior partition walls. Channels shall be spaced not more than 14 inches for 3.4 pounds flat metal lath.

Suspended Ceilings: Suspended ceilings shall be lathed with Hy-rib, or equal weight, .58 lbs. per foot and securely fastened.

Plastering: All interior brick walls, except the Pipe Gallery, Boiler Room and Oconee River Pumping Station, all hollow tile partition walls and all suspended ceilings shall be plastered.

The plaster shall be mixed with clean water to the proper consistency and applied in the usual way. The sand finish shall be applied after the brown coat has been on twenty-four (24) hours, and shall be floated to a true surface free from defects of any kind, with clear, soft pine, or corkfaced floats. Only as much plaster as can be used within one (1) hour shall be mixed at one time and, under no circumstances, shall any plaster that has commenced to set be retempered. The Contractor shall strictly observe and follow the directions accompanying the plaster.

Windows: All window sash shall be of steel construction. They shall be Truscon, Fenestra, G. F. Co., or equal, of dimensions as shown on drawings, and approved by the Engineer. Ventilators shall be the projected type.

Doors: All interior and exterior doors, unless otherwise specified, shall be of hollow steel construction, of designs shown on plans. Where shown, doors shall be constructed for glazing.

Stiles and rails shall be formed of No. 18 gauge steel, reinforced for hardware. Stiles shall have compressed asbestos or cork inserts.

Panels shall be made of two thicknesses of #20 gauge steel with cork or asbestos between. All joints shall be electrically welded. Moulding shall be firmly locked to stiles and rails and no screws shall be used except for glass moulds. Frames shall be constructed of not less than #16 gauge steel, true to profile, with clear straight lines. Transoms shall be of the same type of construction as the door.

Before assembling, all parts shall be paint dipped. Doors, after erection, shall be finished in solid color selected by the Engineer.

Provide door checks, Corbin 104-1/2, or equal, for exterior doors only. Provide bronze thresholds at all doors.

The doors shall be constructed by a manufacturer of established reputation and shall be of the best class of material and attractive in appearance.

Detail drawings shall be submitted to the Engineer for approval before installation. All doors shall be built by one manufacturer and hardware shall be fitted at the place of manufacture.

Metal Base Trim: Six (6") inch metal base trim shall be used in all parts of the building where walls are plastered, and not requiring tile floors.

Painting Doors, Windows and Screen Frames: All doors and windows and all metal trim shall receive one shop coat and two coats of paint after erection, color to be selected by the Engineer.

Rolling Steel Door: A rolling steel door of the dimensions shown on plans shall be furnished for the alum storage entrance of the building. The door shall be of steel slat construction, with chain and gear operation, and shall be mounted flush with the face of the wall. Details shall be subject to the approval of the Engineer. The door shall be constructed by a manufacturer of established reputation.

Hardware: All hardware shall be of cast bronze, except as otherwise specified, and shall be of the P & F Corbin make, or equal. All hardware shall be subject to the approval of the Engineer. All exterior doors shall be furnished with

cylinder locks; all interior doors with tumbler locks. Locks of each type shall be master keyed. Two keys shall be provided for each lock.

Bronze Tablet: The Contractor shall also provide and place in the filter building, a bronze tablet approximately 18" x 24" in size, suitably inscribed in raised letters, as may later be directed by the owner. The cost of this tablet shall be included in the price bid for the section.

Glazing: All glass shall be of the sizes called for by the details, the measurements to be taken from the finished doors and sashes. The sashes shall be glazed outside with the best quality ribbed glass one-eighth (1/8) of an inch thick. All glazed doors shall be glazed with clear plate glass, one-fourth (1/4) inch thick, except lavatory door which shall be frosted. All glass shall be carefully selected, true and without imperfections, and shall be bedded in the best oil-putty, bradded and back-stopped and left clean and sound on completion of the buildings.

Screens: The steel sash manufacturer shall provide copper screens for all exterior windows. The frames shall be of metal construction. Details to be approved by the Engineer. All exterior doors shall be provided with screen doors. The manufacturer of same shall furnish the door manufacturer sufficient details for locating hardware reinforcement in the door frames. Screened doors shall be provided with metal frames not less than 1-3/8" thick. Copper screening, metal grilles on the bottom panel, and door checks #20 P & F Corbin, or equal, for each active door screen. Details shall be submitted to the Engineer for approval before fabrication.

STRUCTURAL STEEL - General: The Contractor shall furnish and erect all roof trusses, purlins, struts, braces, steel stairs, railings, ladders, platforms, and all other steel work shown on the plans or called for in the specifications or necessary to complete the work.

Quality: All structural steel shall conform to standard specifications of American Society of Testing Materials Serial Designation A-9-24.

Framing: The loads upon the principal members have been shown on the drawings, but the details of the connections, other than those shown or furnished, will be left to the Contractor. Allowable stresses shall be in accordance with the specifications of the A.I.S.C. All connections and fastenings between the different members shall be of ample strength and all details shall be in accordance with the best accepted practice, subject to the approval of the Engineer. Minimum thickness of metal shall be one-quarter inch.

Drawings: The Contractor shall furnish to the Engineer, in triplicate, and made in accordance with the general framing plans shown on the drawings, blue prints of the complete shop and erection plans showing all details, and these drawings must be acceptable and approved by the Engineer before steel is fabricated.

Placing: Care shall be taken in placing the work to have the several parts assembled accurately to the proper lines and elevations, so that all holes will correspond. No drifting will be allowed, but if the holes do not match exactly they may be reamed slightly by a taper reamer so as to permit the rivets or bolts to be inserted. In case the eccentricity is too great for good work, or the strength of the joint is liable to be weakened by reaming, the piece will be rejected and a new and satisfactory one shall be provided by the Contractor at his own expense. Where rivets are used they shall be driven in a workmanlike manner, preferably with pneumatic or other power apparatus. All loose or poorly driven rivets shall be cut out and replaced with satisfactory ones.

Painting: All metal work, before leaving the fabricator and before being exposed to the weather, shall be thoroughly cleaned from all loose black scale and rust and given one (1) coat of red lead and linseed oil. After the steel work has been erected, it shall be cleaned and then thoroughly and evenly painted with two (2) heavy coats of paint; the first coat to consist of a mixture of red lead and pure linseed oil, mixed in the proportion of twenty-five (25) pounds of lead to the gallon of oil; the other coat to be of a prepared metal paint, satisfactory to the Engineer, as may be directed. All parts

which will not be accessible for painting in the completed work shall have two (2) coats of paint at the factory.

Quarry Tile: The floors in the Pump Room, Filter Operating Gallery and Hallway should receive 6" x 6" quarry tile. The tile shall be free from pitting, scaling, warping or other imperfections, and the sides shall be clean and straight. Cove bases, approximately six (6") inches in height, shall be provided at all walls.

Laying Quarry Tile: Floors requiring quarry tile shall be finished 1-1/2 inches below the finished floor grade. The tile shall be set in 1:2 cement mortar and all setting must be completed before the cement mortar reaches its initial set. When finishing a day's work, a clean edge of cement mortar shall be left along the last row of tile. The tile shall be set true to surface, with uniform joints. Joints shall not exceed 3/8" in width and shall be finished flush with the surface of the tile. All tile shall be thoroughly soaked in clean water before laying and, after laying, all trace of cement shall be wiped from the surface of the tile. Upon completion, the surface shall be thoroughly cleaned and waxed before final acceptance.

Rubber Tile: Rubber tile shall be used in the laboratory. Cove bases six (6") inches high shall be provided. Tile shall be 1/4 inches thick and shall be smoothly pasted to the floor with close fitting joints. Colors to be approved by the Engineer.

Before final acceptance, the tile shall be thoroughly cleaned and waxed.

Lavatory Tile: Lavatory floor tile shall be white hexagonal, or other acceptable pattern, ceramic tile. Before final acceptance, the tile shall be thoroughly cleaned.

Side walls to the height shown on plans shall be constructed of white brick tile, or terra cotta wall units, and finished with cap-mold and cove base.

Steel Stairs: Steel stairs shall be of the interlocking tread and riser type, with channel stringers moulded as shown. Treads shall be concrete filled and finished with red tile of approved design, with non-slip treads. Before final acceptance, all tile shall be thoroughly cleaned and waxed.

Hand railings and balustrades shall be of the general dimensions and design shown on plans. The stairs shall be constructed by a manufacturer of established reputation, and design shall be submitted to the Engineer for approval.

Railings on the filter operating platform, and where shown elsewhere, shall be of steel and shall be of the same design as the stair rails. Railings shall be fastened to the concrete in an approved manner.

Painting shall be as specified for structural steel.

Roof: Roof deck shall be precast reinforced cement tile, American-Federal, or equal. All slabs shall have full and even bearing on the trusses and all joints shall be filled with eleastic cement. Designs for roof tile shall be submitted to the Engineer for approval.

Upon completion, the under side of all exposed slabs shall be painted with two coats of approved paint.

Type "AA" Barrett specification roof, or equal, shall be laid on the cement tile in strict accordance with the manufacturer's specifications and by a roofing contractor approved by the Engineer. Contractor shall furnish Manufacturers Surety Bond Guarantee for 20 years. The roof shall be flashed as indicated on plans. Roof downspout connections shall be "Holt" or equal. The Contractor shall install all downspouts to the points shown on plans.

Heating: The Contractor shall furnish all materials and equipment and install a heating system as shown on plans and as hereinafter specified.

Boiler: The Contractor shall furnish and install a boiler, Kewanee 1748-J, or equal. The boiler shall be equipped with an automatic stoker of approved design and with proper gauges, safety devices and thermostatic control and shall

be properly insulated. Return condensate pump #1415 Nash, or equal, shall be installed where shown.

Workmanship and Materials: All materials and workmanship shall be of the best quality and all work shall be done in a thorough manner.

Pipe and Fittings: All pipes used throughout the work shall be of the best quality standard weight steel pipe, smooth inside, free from imperfections, true to shape and of the sizes shown on the accepted drawings. All threads shall be clean cut, straight and true. The fittings shall be of the best heavy gray iron, with tapered threads and heavy bead. A liberal supply of flange or screw unions shall be used so as to allow the ready removal of any section.

Placing Pipes: All piping shall be graded so as to drain properly. All mains shall be run in straight lines, and junctions so made as to avoid all traps or pockets which may hold air or water of condensation. Expansion and contraction of pipes throughout the system shall be provided for in the joints so as to prevent buckling or bending and all joints shall be made steam and water tight. All risers, return risers and drops shall be erected plumb and straight. All piping shall be supported by Hanna ball hangers, or other approved expansion hangers or rollers, placed not over ten (10) feet apart. Screw joints shall be made tight with a paste of red lead or graphite, and screwed home. All main steam supply lines shall be properly insulated. Nickel-plated floor and ceiling plates shall be used at all points where pipes pass through floors and ceilings.

Radiators: Two column, cast iron radiators, or single column wall type, made by the American Radiator Company, or equal, shall be used, of heights and lengths necessary to give the required heating surface.

Unit Heaters: The Contractor shall furnish and install unit heaters as shown on plan.

Testing: After completion, the system shall be tested throughout to the satisfaction of the Engineer, and the system made tight and placed in perfect and substantial working order.

Painting: After the system has been satisfactorily tested, all radiators, coils and exposed piping shall be neatly painted, with two (2) coats of aluminum bronze paint.

Plans and Specifications: The Contractor shall prepare plans and specifications of the equipment he proposes to install, for approval by the Engineer.

Plumbing: The Contractor shall furnish and install all plumbing fixtures shown on plans. All fixtures shall be equal to those indicated on plans. All water supply piping two (2") inches in diameter and under shall be hard-drawn, Mueller Type M, or equal, copper with streamline joints. Stall partitions shall be of marble securely fastened with chromium-plated fittings and cap nuts to walls and floors. All plumbing work shall be of first-class quality, performed in accordance with local regulations.

Laboratory samplers and ejectors are not included in this contract but the Contractor shall run all water supply and drain lines to points of connection for the samplers. Contractor for Section No. 2 will run sample lines.

Wiring: The Contractor shall furnish and install all 110-volt wiring for lighting and fractional horsepower motors, including all lighting fixtures and lights. All wiring shall be run in galvanized iron conduits and shall be concealed wherever possible. Transformers will be furnished and placed by the Owner.

All wiring shall conform to the rules and regulations of the National Board of Fire Underwriters; shall be rubber insulated and protected by the best double-braided outside covering. The copper of all conductors shall have at least ninety-seven (97%) per cent conductivity. All wires for the lighting system shall be so proportioned that when carrying twenty (20%) per cent greater current than now specified, the maximum loss from the main switch and fuse, where the feeder enters the building to the farthest lamp in the main buildings, shall not exceed two (2) per cent and the maximum loss in any distributing circuit shall not exceed one (1) per cent. No wire smaller than

No. 14 B & S gauge shall be used. All wiring shall be run in galvanized iron conduits and concealed, the wires being run in parallel straight lines. Where joints are made, the wires shall be well cleaned and twisted, thoroughly soldered, well wrapped with the best Okonite tape, or equal, and coated with waterproof paint.

Cabinet: On the wall at the point indicated shall be placed an iron cabinet in which shall be located switches for controlling the circuits. The switches shall be of the thermal breaker type, not over fifteen (15) ampere capacity.

Circuits and Fixtures: The location and type of all fixtures is shown on plans, together with the circuits controlling them, and the Contractor shall furnish and install all necessary wiring and fixtures shown on plans.

Painting: All exposed metal work shall be painted with two coats of approved paint.

All plastered walls and ceilings shall be painted with one filler coat and two coats of oil paint. All exposed concrete ceilings and columns shall be cleaned and painted with two coats of lead and oil.

All interior walls not receiving plaster shall receive one priming coat and two coats of approved paint.

Clear Water Well: The Owner will perform all excavation, will furnish and place all concrete and reinforcing steel and all miscellaneous iron. The Contractor shall furnish all material and construct the 6" hollow tile division wall and furnish and install ventilators and swing gate in the division wall.

Excavation, Backfill and Roads: The Owner will perform all excavation and will backfill around all structures. The Owner will also construct all roads but the Contractor shall excavate trenches and furnish and install all vitrified concrete and soil pipe lines and manholes.

Oconee River Pumping Station: The Contractor shall furnish all materials and construct the Oconee River Pumping Station and Intake complete, including all earth and rock excavation, all reinforcing steel and concrete, together with

structural steel superstructure and 110 volt lighting and fixtures. Contractor for Section 2 will furnish and install all pumping equipment and power wire and all cast iron pipe, valves and fittings, and other equipment.

Sandy Creek Pumping Station: The Contractor shall furnish all materials and labor and construct the concrete lining for this station; also furnish structural work shown on plans. Contractor for Section 2 will furnish and install centrifugal pump, pipe, fittings, valves and power wiring.

Paint all inside brickwork, ceiling, structural steel and miscellaneous iron as previously specified.

Fine Aggregate for Concrete: Fine aggregate shall consist of sand having clean, hard, strong, durable, uncoated, siliceous grains, free from injurious amounts of organic matter, loam or other deleterious materials. It shall be graded from fine to coarse with the coarser particles predominating within the following limits:

Passing No. 4 sieve, 95%.

Passing No. 20 sieve, 30 to 70%.

Passing No. 50 Sieve not more than 30%.

The fine aggregate shall be of such quality that mortar briquettes, cylinders or prisms, consisting of one part by weight of Portland cement and three parts by weight of fine aggregate, mixed and tested in accordance with the methods described in the Standard Specifications and Tests for Portland Cement (Serial Designation C-9-26) of the American Society for Testing Materials, shall show a strength at the age of 7 and 28 days not less than that of 1:3 Standard Ottawa sand mortar of the same consistency made with the same cement.

Upon failure to meet the grading and the Ottawa test requirements set forth in the foregoing paragraphs, material otherwise satisfactory for Class A concrete, having a test ratio of 85% or above and material otherwise satisfactory for Class B and C concrete, having a test ratio of 75% or above, when compared with Standard Ottawa Sand, may be used provided the proportion of cement be increased so as to produce 100% strength ratio for material to be

used in Class A concrete and 90% strength ratio for material to be used in Class B and C concrete. The extra proportions shall be determined by laboratory tests, and the contractor shall receive no extra compensation for such increase of cement.

No fine aggregate showing a color darker than the standard color, when tested in accordance with the Standard Method of Test for Organic Impurities in Sands for Concrete of the American Society for Testing Materials, shall be used.

Coarse Aggregate: The coarse aggregate shall consist of crushed stone or gravel, free from soft, thin, elongated or laminated pieces, disintegrated stone, vegetable or other deleterious material. It shall not contain more than 7 per cent by weight of material that will pass a screen having 1/4-inch openings and shall be well graded between 1/4-inch and 1-1/2-inches, except that in all work where the least dimension is 6 inches or less, the coarse aggregate shall pass a screen having 3/4-inch opening.

Cement: Only Portland Cement shall be used. The cement shall conform to the Standard Specifications for Portland Cement of the American Society for Testing Materials. Cement shall be furnished in strong cloth bags containing at least 93 pounds net; it shall be stored in a suitable tight storehouse, having wooden floors raised above the ground, and of sufficient capacity to contain a two weeks' supply. Shipments shall be kept separately, and the Engineer shall be promptly notified of the receipt of each shipment, so that he may break the seal and examine cement before unloading it from the car. Ample time shall be allowed for testing, which the Contractor shall have done at the mill by a Testing Laboratory, acceptable to the Engineer. Before any cement is used the 28-day test report on same shall be submitted to the Engineer and approved. Cement which is unsatisfactory shall be at once removed from the work. The Engineer shall have the right to use such means as may be necessary to insure the cement being under his charge and direction at all times.

Cement Tests: Tests shall be made in general in accordance with the standard methods of the American Society for Testing Materials. (Serial Designation C-9-26.)

Concrete: Concrete shall be of three different classes as herein specified:

	Approximate Mixture	Required Minimum Compressive Strength 28 days
Class A	1:2:4	2500 lbs. sq. in.
Class B	1:2½:5	1800 lbs. sq. in.
Class C	1:3:6	1500 lbs. sq. in.

Class A concrete shall be used throughout the work except where expressly noted on plans.

One bag of cement shall be considered as having a volume of one cubic foot and the sand and stone shall be measured loose.

The concrete materials, including cement, fine aggregate, coarse aggregate and water, mixed in the proportions in which they are to be used in the work and tested in accordance with Standard Methods of Test, shall at 28 days develop a strength not less than that specified above. Upon failure to meet this requirement, the proportion of cement in the concrete mix shall be increased or the proportion of cement, fine aggregate, coarse aggregate and water shall be changed in such a way as to produce the specified strength.

Mixing: The concrete shall be mixed by an approved batch machine, such as will secure a suitable mixing of each batch of concrete. These arrangements shall provide for the correct measurement of each of the ingredients before placing in the mixer, and the introduction of a measured quantity of water at any stage of the process. The mixing shall be continued until every part of ballast is completely covered with mortar. The concrete shall then be used immediately. No concrete will be allowed to be put in place after its initial set has taken place. No retempered concrete will be allowed to be used under any condition. In general the minimum amount of water shall be used consistent

with securing a workable concrete. The concrete must be retained in the mixer for a period of one and one-half minutes. For concrete exposed to water pressure, an admixture of Celite or equal in the amount of 3 to 5% by volume of the cement used shall be added to the mix.

Placing of Concrete: GENERAL -- Before beginning a run of concrete, hardened concrete and foreign materials shall be removed from the inner surface of the mixing and conveying equipment.

APPROVAL -- Before depositing concrete, debris shall be removed from the space to be occupied by the concrete; forms shall be thoroughly oiled. Reinforcement shall be thoroughly secured in position and the form work shall be approved by the Engineer.

HANDLING -- Concrete shall be handled from the mixer to the place of final deposit as rapidly as practicable by methods which prevent the separation or loss of the ingredients. It shall be so deposited as to maintain until the completion of the unit, a plastic surface approximately horizontal. Forms for walls or other thin sections of considerable height shall be provided with openings, or other devices, that will permit the concrete to be placed in a manner that will avoid accumulations of hardened concrete in the forms or metal reinforcement. Under no circumstances shall concrete that has partly hardened be deposited in the work.

CHUTING -- When concrete is conveyed by chuting, the plant shall be of such size and design as to insure a practically continuous flow in the chute. The angle of the chute with the horizontal shall be such as to allow the concrete to flow without separation of the ingredients. The delivery end of the chute shall be as close as possible to the point of deposit. When the operation is intermittent, the spout shall discharge into a hopper. The chute shall be thoroughly flushed with water before and after each run; the water used for this purpose shall be discharged outside the forms.

COMPACTING -- Concrete, during and immediately after depositing, shall be thoroughly compacted by means of suitable tools. For thin walls or inaccessible portions of forms, where rodding or forking is impracticable, the concrete shall be assisted into place by tapping or hammering the forms opposite the freshly deposited concrete. The concrete shall be thoroughly worked around the reinforcement, and around embedded fixtures, and into the corners of the forms.

REMOVAL OF WATER -- Water shall be removed from excavations before concrete is deposited, unless otherwise directed by the Engineer. Any flow of water into the excavation shall be diverted through proper side drains to a sump, or be removed by other approved methods which will avoid washing the freshly deposited concrete. Water vent pipes and drains shall be filled by grouting or otherwise, after the concrete has thoroughly hardened.

PROTECTION -- Exposed surfaces of concrete shall be protected from premature drying for a period of at least seven (7) days after being deposited, unless otherwise specified. This shall be accomplished by covering with burlap, canvas or other material approved by the Engineer and left continually wet or by continuous sprinkling as the Engineer may elect.

Placing Steel in Concrete: All steel reinforcement shall be placed in the exact position and with the spacing shown on the drawings or ordered, and it shall be securely fastened in position to prevent its becoming displaced during the placing of the concrete.

Whenever it is necessary to splice reinforcement, the lap shall be 40 diameters of the bar.

Water: Water for making mortar and concrete and for all other purposes shall be supplied by the Contractor. He shall bear the expense of running pipe, pumping, and of making such arrangements and connections as may be necessary. Water used for concrete shall be accurately measured. The source of supply must be approved by the Engineer.

Forms: GENERAL -- Forms shall conform to the shape, lines and dimensions of the concrete as called for on the plans. Lumber used in forms for exposed surfaces shall be dressed to a uniform thickness, tongued and grooved 1½" in thickness, and shall be free from loose knots or other defects. Joints in forms shall be horizontal or vertical. For unexposed surfaces and rough work undressed lumber may be used. Lumber once used in forms shall have nails withdrawn and surfaces to be in contact with concrete thoroughly cleaned before being used again.

DESIGN -- Forms shall be substantial and sufficiently tight to prevent leakage of mortar; they shall be properly braced or tied together so as to maintain position and shape. If adequate foundation for shores can not be secured, trussed supports shall be provided.

WORKMANSHIP -- Bolts and rods shall be used for internal ties, they shall be so arranged that when the forms are removed, no metal shall be within 1 inch of any surface. Wire ties will be permitted only on light and unimportant work; they shall not be used through surfaces where discoloration would be objectionable. Forms shall be set to line and grade and so constructed and fastened as to produce true lines. Special care shall be used to prevent bulging. On all work requiring watertightness, the method of sealing holes left by the withdrawal of tie rods shall be subject to the approval of the Engineer.

MOULDINGS -- Unless otherwise specified, suitable mouldings or bevels shall be placed in the angles of forms to round or bevel the edges of the concrete.

OILING -- The inside of forms shall be coated with non-staining mineral oil or other approved material. The oil shall be applied before the reinforcement is placed.

INSPECTION -- Temporary openings shall be provided at the base of column and wall forms, and at other points where necessary, to facilitate cleaning and inspection immediately before depositing concrete.

REMOVAL -- Forms shall not be disturbed until the concrete has adequately hardened, and then only with the permission of the Engineer. Shoring shall not be removed until the member has acquired sufficient strength to support safely its weight and the load on it. Members subject to additional loads during construction shall be adequately shored to support both the member and construction loads in such a manner as will protect the member from damage by the loads; this shoring shall not be removed until the member has acquired sufficient strength to support safely its weight and the load on it.

Immediately after the removal of forms, all wires and rods used for tying the forms shall be promptly cut just beneath the surface of the concrete and the holes filled with cement mortar.

RUBBING -- Immediately upon the removal of forms from concrete exposed to view, the surface shall be wetted and rubbed with a carborundum brick until even and smooth and of uniform appearance, without applying any cement or other coating.

Care of Work: No new work shall be laid during storms and freshly laid concrete shall be protected against washing by storms or otherwise.

Joints: Provisions for dovetails and grooves, as shown or directed, shall be made for bonding at joints. It is intended that all joints that come in contact with water or may cause a leak in any structure be provided with suitable metal water stops. In horizontal joints, where new work is joined to old, the old work shall be thoroughly cleaned, wet, and a bed of mortar one inch thick, mixed in the proportion of one part cement and one part sand, shall be used to secure a bond.

Defective Work: Should any voids or other defect be discovered upon any part of the work, which will be covered with earth when construction is completed, these voids shall be carefully filled with mortar and plastered or otherwise suitably repaired as directed. Should voids occur upon work which will be exposed after completion, the defective work shall be taken down or cut out and

the space refilled with suitable material and in a proper manner, at the Contractor's expense.

Steel Reinforcement: All steel for reinforcing concrete shall be of shapes, weights and sizes as shown on the drawings, or ordered. Steel reinforcement shall be of a quality and character meeting the requirements of the Standard Specifications for Billet-Steel Concrete Reinforcement Bars, of the American Society for Testing Materials, known as Serial Designation A 15-14.

Shaping: The reinforcing steel shall be bent to the shapes shown on the drawings or as required. The ends of some of the steel bars used in the beams or slabs shall be bent up as directed or as shown in working details to be furnished later. Stirrups shall be placed in the reinforced concrete beams, if and as required. Placing and bending of steel shall be as shown on plans.

Protection of Steel: Steel for reinforcement shall be newm unrusted stock, free from mill scale, delivered without rust, other than that which may have accumulated in prompt transportation to the work. It shall be at all times thoroughly protected from moisture and kept above ground under water-tight shed or building, until placed in final position. Furthermore, after placing in position, if concreting be interrupted for any considerable number of days, the steel shall be protected with canvas or other satisfactory covering. Any steel that is to be left projecting for a considerable time shall be painted with a heavy coat of neat cement grout. Any rods which show scaly rust before the concrete is placed shall be satisfactorily cleaned. Steel must be so placed, and at such times, as to prevent the oil used on forms from coming in contact with it.

Sewer Lines: The Contractor shall furnish all materials and construct all concrete or vitrified and soil pipe sewers. All concrete sewer pipe used in the work shall conform to the standard specifications of the American Society for Testing Materials, Serial Designation C-14-24.

Laying Sewer Pipe: The pipe and specials shall be laid to grade given by the Engineer, in such a manner as he directs, with joints closed and even butting all around, so as to give a true and even surface to the invert throughout the length of the sewer. A gasket of jute soaked in neat cement grout shall be introduced between the hub and spigot and driven to the bottom of the hub. The space between the spigot and hub shall then be filled with cement mortar mixed 1:1 and thoroughly pressed in on the bottom, sides and top to secure a water-tight joint. The mortar shall be applied with a rubber mitt, and rammed with a wooden caulking tool, and finished with a generous bevel. The interior pipe at each joint shall be scraped clean, using a suitable drag swab. Before leaving the work at any time, the sewer shall be closed at its upper end; after the work is completed, the pipe shall be carefully and thoroughly cleaned of all refuse and obstruction.

The trench shall be drained so as to prevent water running through the newly laid pipe or washing the mortar out of the joints.

The price bid for sewer pipe shall include cost of furnishing, placing and laying same, together with specials, excavating and backfilling and performing all the necessary work as herein outlined in connection therewith.

Manholes: All manholes shall be of brick, 8" to 12" thick, laid up with 1:2 cement mortar, plastered on the outside, four feet in diameter at the bottom, and 2 feet in diameter at the top. They shall be fitted with cast iron frame and cover of an acceptable design, weighing not less than 350 pounds. Bottoms of manholes shall be of brick or concrete, and shall be provided with channels and stubs as directed. Manholes shall be provided with steps.

Coal Bin: As shown on the plans, the Contractor shall furnish and install a steel coal bin and coal chute. Detail plans shall be furnished for approval. The Owner will install all necessary bolts and frame for the coal chute in the concrete. The general specifications for structural steel shall apply for material and workmanship of the steel bin. One shop coat of red lead and two

field coats of approved paint shall be applied.

Dry Feed Room Chemical Bin: The Contractor shall provide a three compartment sloping top type of chemical bin constructed of wood, with three separate hinged covers. The overall dimensions shall be as follows:

Height back	5 ft. 0"
Height front	3 ft. 0"
Length	6 ft. 6"
Width	3 ft. 6"

The bin shall be divided into three compartments of approximately 3 ft., 1 ft. 10" and 1 ft. 4" wide, and provided with separate hinged covers with grab handles. The bin shall be constructed of 1" tongue and groove, grade A pine and shall be painted inside and out with one priming coat and two coats of approved acid resisting paint. A three step, portable, step ladder 24 inches high shall be provided.

Laboratory Furniture: The Contractor shall furnish and install steel benches, cabinets, lockers, desk and stools shown on plans.

The laboratory bench shall be the best quality art metal construction and shall be provided with a wood top consisting of two (2) inch maple flooring on edge, securely glued and fastened and the top finished to a smooth and even surface. Detail drawings to be approved by Engineer.

Hot Water Tank: The Contractor shall furnish and install an electric water heater tank storage type GE 112W29 - 110 volt together with the necessary wiring and hot water connections to laboratory sink and to lavatory fixtures.

Work to be Done: The work to be done under this Section consists in furnishing and installing all cast iron pipe, specials, valves and drains at the Filtration Plant, River Pumping Station and Sandy Creek Station , as shown on plans; and furnishing and installing all filter and pumping equipment complete, as shown on plans, and specified, and all power wiring.

Work Performed by Others: All concrete work will be constructed by others. Contractor for Section No. 1 will perform all structural and brick work and all plumbing, heating, lighting, necessary for the completion of the superstructures of the filter plant and river pumping stations.

Small Valves: Valves two and one-half (2-1/2) inches in diameter and under, unless otherwise specified, must be bronze gate valves and suitable for the pressures intended and satisfactory to the Engineer. Bidder must state the type and name of the manufacturer of valves he proposes to use, in his proposal.

Cast Iron Pipe: Unless otherwise specified, all cast iron pipe shall be Class "A", except when connected to high pressure lines, where Class "C" will be required. Centrifugal pipe, Class 100, may be used instead of Class "A" and Class 150 instead of Class "C".

The City of Athens has on hand at the site of the work the following cast iron pipe, in 12 foot lengths, which will be furnished to the Contractor at the prices indicated:

569 ft.	20"	Class 100	@ 1.75	per foot.
1104 ft.	16"	Class 100	@ 1.45	per foot.
912 ft.	12"	Class "E"	@ 1.25	per foot.

Small Filter Piping: All small filter piping from the main pressure line shall be of 1/2 inch copper, with stream line joints, unless otherwise specified. A Scott valve, or equal, shall be provided at one port of each hydraulic valve

cylinder, and other valves shall be inserted where necessary.

Furnishing and Installing Cast Iron Pipe: All cast iron pipe lines, fittings and valves shown on plans, either inside or outside the buildings, shall be furnished and installed by Contractor for Section No. 2.

All joints in bell and spigot pipe shall be lead. All hangers and supports shall be subject to the approval of the Engineer. Flanged pipe shall be carefully aligned to allow tight setting of bolts without straining the flanges. All flanged joints shall be made up with gaskets, approved by the Engineer.

Painting: After the completion of the work and the testing thereof, and after the completion of the superstructure, the cast iron pipe, specials, hangers, etc., in the pipe gallery, together with the controllers and appurtenances, shall receive two (2) coats of aluminum paint of best quality and make satisfactory to the Engineer.

Filter Controllers: The Contractor shall furnish and install in the effluent pipe of each filter a ten (10) inch rate controller, Builders Iron Foundry, Simplex Valve and Meter Company, International, or equal make, of the general dimensions indicated on the plans.

Each filter has a rated capacity of one million gallons per day. Controller must be capable of accurately controlling all rates between 1.50 and 0.50 million gallons per day without hunting. Maximum loss of head through the controller, at normal rate, shall not exceed 0.4 feet when the controller valve is open and filter is operating at normal rate.

All equipment and appurtenances must be of first quality and the bidder must submit plans and specifications for the controller and all equipment, with his proposal.

The bid price in the proposal shall include the furnishing and installation of the controller complete, with all equipment and appurtenances ready to operate.

Controller Gauges: There shall be furnished and set on each operating table a venturi controller gauge which shall indicate, on separate dials with independent mechanism, the loss of head and the rate of flow of the effluent.

Indicators shall be ivory Pyralin, or other material of similar quality and appearance, with engraved black lettering, and graduations shall be uniform; cases shall be cast aluminum finished in black. Mercury chambers, with open riser tubes, shall be provided for all gauges. The dial shall be operated on an arc of not more than 120 degrees.

Operating Tables: There shall be furnished and installed, for each of the filter units, an operating table for the control of the filter valves. These tables shall be constructed of marble, with Bakelite doors. The marble shall be sound, best quality, gray marble.

The top of the table shall be 1-1/4 inches thick and project one inch over all sides. The sides shall be 7/8" thick and held together by means of brass angle clips or plates. The bolts used on these supporting clips shall be brass, chromium-plated, cap head nuts.

The ends of the table shall be constructed of one piece of marble, without paneling. The front and rear shall be constructed alike.

There shall be mounted on each table five (5) chromium-plated valve levers, indicators and pointers, with proper name plates at the front of each lever to indicate the valve controlled thereby.

Operating tables shall be of first-class construction and design throughout, of neat appearance, and they shall have a handwheel located on the outside of the table for cutting off the pressure water from the manifold when the table is not in use, to prevent tampering with the filter operating valves. Submit detail plans for approval before manufacture.

Phosphor-Bronze Wire: The wire for connecting indicators with the hydraulically operated valves and for connecting floats with gauges shall be of phosphor-bronze, with fabric core. Provide small bronze turnbuckle in each line to

remove slack.

Strainer System: The Contractor shall furnish and install a copper strainer system, as shown on plans. It shall consist of three and one-half (3-1/2) inch by three (3) inch cast copper tees, and three and one-half (3-1/2) inch bell mouth riser, of the approximate dimensions shown on plans. The risers shall be riveted to the tees. The tees shall be accurately set before pouring the concrete. Into the tees shall be fitted three (3) inch hard-drawn copper laterals, Type M-Gov't. The laterals shall be drilled as shown. Clearances shall be approximately .001 inch and all joints shall be made drip tight under 20 pounds pressure, without the use of any joint materials. Contractor shall test a specimen of joint in the presence of the Engineer before installing.

The laterals shall be capped at the filter walls and supported as shown. All joints shall be of the Mueller Streamline Type.

Gate Valves (General): Gate valves shall conform in general with the specifications of the American Water Works Association. The valves must embody the best workmanship and finish, and open and close freely and easily. In closing, the gates must move without friction to their position opposite the ports, both discs being then closed squarely against the seat rings. With disc raised, each valve shall have a clear waterway of the full nominal diameter of the valve. Valves shall have hub or flanged ends as required. All flanges shall be faced and drilled American 125# Standard.

All valves on low pressure service, unless otherwise specified, shall be Class AA, designed to withstand a test pressure of 50# per square inch, and guaranteed for 25# water working pressure. All other valves shall be Class "C", designed for 300# test and guaranteed for working pressures of 150 pounds.

All hand operated valves shall open by turning to left.

Valves shall be operated by nut, handwheel or stand, as required. Operating nuts shall conform to present city standard. Wheels shall be of ample diameter for easy operation of valve. Operating nuts and wheels shall have

cast onto them an arrow indicating the direction of turning for opening the valve.

All wearing and bearing faces of the valve shall be suitably proportioned, and all working parts shall be made of bronze, or be bronze mounted.

The seats and face rings for the valve discs shall be of satisfactory dimensions, according to the best shop practice, and the seat rings shall be faced in a lathe, to a true and even surface, so as to form a water-tight joint when drawn together, and if such joint cannot be produced by machine work, then the faces shall be dressed, and with disc ground to its own true bearing without the aid of templates. Such face rings shall be securely screwed into the recesses made therefor in the valve case. The face rings of the disc shall be machined, dovetailed or driven into corresponding machined grooves in the discs or gates and riveted on with bronze or suitable non-corrodible metal rivets.

All valves to be covered with earth shall be provided with valve boxes and all geared valves with grease covers and valve boxes.

Hydrants: Hydrants shall conform with the specifications of the American Water Works Association. All hydrants shall be of the compression type and shall be equipped with two 2-1/2 inch hose nozzles; shall have 4-inch valve opening and 6-inch bottom connection.

Pump Valves: All valves on suction and discharge of pumps shall be flanged valves, Class "C", American Water Works standard. Valves on high pressure pumps in main pump room shall be equipped with indicating floor stands, smoothly finished. Valves on all other pumps shall be O.S. and Y. type.

Sluice Gates: Inlet sluice gates in the Sedimentation Basin will be furnished and set by the Owner. The Contractor shall furnish and set one 24" x 24" sluice gate at the river pumping station. This gate shall be designed for an unseating pressure of 10 lbs. per square inch. It shall be bronze mounted and shall be equal to Chapman - Table 8. Provide steel stem and geared floor stand.

Mud Valves: The Contractor shall furnish and install mud valves in the Sedimentation Basins. Mud valves to be iron body, bronze mounted, spigot or flanged end as required, fitted with extension stem, guides and handwheel.

Shear Gates: The Contractor shall furnish and set all shear gates shown on plans. Shear gates shall be iron body, bronze mounted, and shall be equipped with extension handle and rack.

Flap Gates: Furnish and install flap gates in accordance with details shown on plans.

Check Valves: All check valves shall be furnished and installed by the Contractor. Check valves shall be Chapman Tilting Disc Type, or equal.

Automatic Cone Valve: The Contractor shall furnish and install an automatic cone valve where shown on plans.

The valve shall be of the Cone Plug type employing only axial motion to unwedge the Plug from its seats, rotary movement to open the valve and only axial movement to rewedge the valve in the open position. The valve proper shall consist of three main parts: (1) a valve casing, called the casing; (2) a valve cover, called the cover; (3) a conical closing element called the plug, the plug being the only movable part in the line. On the plug there shall be four bronze seats raised a minimum of 1/4" above the unfinished cast iron so that when the valve is in the fully open position, the fluid under pressure in the pipe line shall be absolutely confined within the circular ports through the plug and casing.

The piston of the hydraulic cylinder shall be connected to an operating mechanism by means of a single connection, this single connection operating through a stuffing box. The operating mechanism shall be enclosed in a substantial casing rigidly attached or integral with the cover of the valve. The operating mechanism shall be capable of being inspected, removed and repaired without interferring with the valve proper or the hydraulic cylinder. All parts which cause wedging or unwedging and are subject to thrust load shall have

bearing surfaces of ample size so as to keep the unit bearing pressure low.

The operating mechanism shall permit adjustment of wedging to compensate for any wear that may develop. There shall be no sudden change from axial to rotary movement and from rotary to axial movement during the operation of the valve. The valve shall consist of independent unit assemblies which can be inspected, removed, repaired and replaced without the necessity of dismantling the entire valve. All parts shall be of first class workmanship, easily accessible, easily replaceable and shall be manufactured of the best material suited for the purpose. An indicator on the outside of the valve, showing position of valve opening, shall be furnished.

Automatic Cone Valve Control Mechanism: There shall be furnished a Control valve, pitometer type, assembled as an integral unit on the hydraulic Cone Valve.

The pitometer control valve shall be arranged so that by energizing the pilot valve, the cone valve is opened or closed by means of increasing velocity or decreasing velocity through the valve. It should be arranged so that the control valve can be set to close at any pre-determined velocity and before reversal of flow occurs. The pitometer control shall be for a flow of 0 to 3500 GPM. Water pressure available for operating hydraulic cylinder is 75 lbs. per square inch.

Hydraulically Operated Valves: All valves on pipe lines in the pipe gallery shall be hydraulically operated, unless otherwise shown. The cylinders shall have sufficient area of cross section to insure the ready opening and closing of the gates, with a minimum water pressure in the cylinder of seventy-five (75) pounds per square inch. Cylinders shall be attached to the valve casting or frame. The maximum pressure against which any of the gates will be required to operate will be twenty (20) pounds per square inch. Cylinders shall be cast iron lined with brass or bronze. Pistons shall be of brass or bronze or of cast iron with brass or bronze facings. Pistons for larger valves shall be so packed as to prevent leakage past the pistons. They shall move with a

uniform steady motion and shall not stick, be jerky or unsteady.

A brass or bronze indicating stem, having a minimum diameter of 3/4 inch, uniform in section, shall be provided to extend through the top of the operating cylinder when the valve is closed, and shall carry a suitable attachment for holding a wire leading to the indicating apparatus on the operating table. The end of the indicating stem shall be provided with a heavy bronze eyelet. Brass or bronze stuffing boxes shall be provided where the stem of the valve and indicator stem pass through the head of the operating cylinder.

Gate valves used with hydraulic cylinders shall conform with specifications for gate valves, and shall be designed for a working pressure of 25 lbs. per square inch and tested to 50 lbs. per square inch.

Dry Feed Machines: The Contractor shall furnish and install four (4) chemical dry feed machines for feeding aluminum sulphate, hydrated lime, or soda ash. The machines shall be manually controlled and motor driven by three phases, 220 volt, 60 cycle motors. They shall be capable of accurately feeding from 100 to 1000 pounds of aluminum sulphate or hydrated lime per 24 hours, and shall be so calibrated that they may be readily adjusted to the rate of feed desired. The metals used in the construction shall be such that they will not be readily affected by the chemicals used.

Each machine shall be provided with a steel hopper which shall be attached to the machine and shall be of the approximate height shown on plans. The hoppers shall be provided with a steel hinged cover. The Contractor shall furnish and install all pressure piping and valves from the service main and all discharge piping and valves. Bidders must submit detail plans and specifications of the equipment they propose to furnish, and machines which cannot show a successful operating record will not be considered.

Small Pressure and Discharge Piping: The Contractor shall furnish and install all pressure and discharge lines for dry feed machines, chlorinator and ammoniator, and all other small piping shown on plans or required, except lines for plumbing in lavatory, laboratory and boiler room. All pipe two (2") inches in diameter and under shall be hard drawn copper unless otherwise specified. Type M Mueller, or equal, with streamline joints, unless otherwise shown or specified. All pipe larger than two (2") inches shall be cast iron. Bronze valves, Scott type, shall be provided where required.

Sampling Equipment: The Contractor shall furnish and install sampling equipment shown on plans, together with all ejectors and connections. The Samplers shall be constructed as shown. All exposed metal work shall be chromium-plated and Samplers shall be so designed that they may be readily disassembled for cleaning.

Sight Tubes: The Contractor shall furnish and install sight tubes, porcelain plate, vent pipe and drain valve in effluent weir box. Lighting fixtures will be installed by Contractor on Section 1.

Lime Cone: The Contractor shall furnish and install Lime Cone as shown on plans.

Drinking Fountain and Refrigerator: Furnish and install one drinking fountain, PB-3G.E. Co., or equal, and one refrigerator G.E.-L-14 or equal.

Contractor for Section 1 will furnish electrical connections.

Chlorinator and Ammoniator: Furnish and install two Wallace and Tiernan Co. visible vacuum chlorinators, or equal, using hydraulic pressure compensation, with flow indicator and measuring orifice, a single unit, water sealed; also one ammoniator, Wallace and Tiernan Company, or equal, solution feed. Make all necessary connections.

Scales: Furnish and install one scale, Fairbanks-Morse 1068, or equal, for ammonia cylinder, and one Fairbanks-Morse 11,912, or equal, equipped with dial graduated to 1000 lbs., with oil seal and rubber gasket.

Raw Water Control Mechanism: Furnish and install an hydraulically operated raw water control. The control mechanism shall control the water level in the Sedimentation Basins for all rates from 0 to six million gallons daily, with a variation of not more than three inches in the water level in the basins. The operation shall be quick and certain in its response to changes in rates of draft and with a constant rate: there shall be no hunting and after any change in rate, the control mechanism must establish proper valve setting in a minimum time. Provide four-way cock in a convenient position for manual operation. Install all necessary floats and pipe connections. Hydraulic valve to be Class A - square body.

Raw Water Meter: Furnish and install an orifice type meter, electrically operated, with registering and direct reading recording instrument with indicator scale. Meter body to be mounted in pump room; instrument in chemical room. Contractor for Section No. 1 to provide 110 volt electrical connections. Contractor for Section No. 2 to run conduit and wiring between meter body and instrument. The meter shall be capable of accurately reassuring all rates of flow between one and six million gallons per 24 hours. Furnish 500 charts.

Venturi Meter: Furnish and install one 20 x 10 venturi meter tube and one indicating, integrating and recording, pedestal type register. The meter shall be capable of measuring accurately all flows 500,000 and 8,000,000 gallons daily. Register shall indicate the flow in hundreds of gallons per minute, record in millions of gallons per 24 hours and register total flow. Furnish five hundred 24 hour charts with instrument. Run all necessary connections between tube and register.

Depth Gauge: Furnish and install indicating and recording depth gauge where shown on plans and connect to pump suction chamber, in which shall be placed a float tube which must extend above pump room floor. Base of instrument to cover top of float pipe. Graduate charts from 0 to 14 feet. Furnish 500 charts.

Clocks: Furnish electrical clocks for all recording instruments.

Pressure and Vacuum Gauges: Furnish and install in the main pump room a one piece metal panel approximately 5 feet high and 18 inches wide, with edges rolled back 12 inches and with removable back. On this panel mount horizontal indicating gauge indicating pump vacuum, pressure and line pressure, also one pressure recording gauge with 12 inch chart. Horizontal gauge to have manifold connection to each high pressure pump and to high service line. Recording gauge to be connected to high service line only. Install needle valves for control. Install corporation cock at main. Install connections for monometer where required. Gauges and panel to be similar to Republic Master Panel. Submit detail drawings for approval.

Wash Water Tank Gauge: Furnish and install on the operating platform an altitude gauge to indicate the depth of water in the wash water tank, Ashton 60-A, or equal, with 12 inch dial. Place stop cock at gauge and connect to wash water line in pipe gallery with 1/2 inch copper pipe and corporation cock at main.

Mixing Equipment: The Contractor shall furnish and install in the mixing basin a mechanical mixer for mixing the coagulant with the water. The mixer shall be installed in three units each driven by its own 220 volt motor; maximum and minimum speeds of paddles shall be as follows:

1st Unit	150 ft. per min.	to	50 ft. per min.
2nd "	75 ft. per min.	to	25 ft. per min.
3rd	60 ft. per min.	to	20 ft. per min.

The direction of travel of the paddles shall be perpendicular to the direction of flow in the basin. Paddles shall be driven by roller chain with a constant speed motor equipped with a speed changing device permitting infinite variations in speed between the maxima and minima given above. Motor and speed changing device to be in one unit. Capacity of motors to be such that there will be no overload at any speed. Main starting switch to be located in chemical room as shown. Each motor to have cut-out switch at motor. Motors to

be 220 volt, 3-phase, 60 cycle, 40°C.

The Owner has installed conduit pull boxes, etc., in the concrete from the motor locations to the chemical room.

The Contractor shall install three (3) conductor lead covered cable in this conduit for the operation of the motors.

Motors shall be designed for outdoor but the Contractor shall install removable sheet steel housing provided with hinged cover for each motor, and control mechanism.

Wash Water Tank: Furnish and install a wash water tank having a total capacity of 75,000 gallons. Distance from top of foundations to bottom of tank to be 26 feet. Diameter of tank to be approximately 30 feet.

Foundations: All foundations will be furnished by the Owner. As soon as possible, after award of contract, the Contractor shall furnish a preliminary foundation plan to the Engineer. Final foundation plans shall be checked and approved both by the Engineer and the Contractor before construction begins.

Structural Steel and Tank Plates: All structural steel, tank and roof plates, shall be made by the open hearth process. The steel shall conform to the specifications of the American Society for Testing Materials. Serial Designation A 7-24 for Structural Steel for Bridges.

Rivets: All rivets and all steel requiring forging or welding shall be of open hearth steel of the grade known as "Rivet Steel".

Dead and Live Loads: The dead load shall consist of the weight of the structure; the live load shall consist of the weight of the water in the tank, and a roof load of 20 pounds per square foot or a concentrated load of 200 pounds at any point.

The wind pressure shall be assumed at 30 pounds per square foot acting in any direction on two-thirds of the projected area of the tank.

Roof: The roof shall be domed and shall be designed for stresses in accordance with these specifications. A steel door at least 20" x 20" shall be provided

in the roof. Suitable provision shall also be made in the roof for venting the tank to prevent collapse due to sudden withdrawal of water.

Ladders: Steel ladders shall be furnished for both the inside and outside of the tank.

Inlet and Overflow Connections: Provide steel riser pipe at least 30 inches in diameter, with a 2" bottom drain tap and a 4-inch overflow.

Drawings: The Contractor shall furnish, with his bid, drawings showing the general design of the structure which he proposes to build, together with strain sheets and estimated weights. The drawings shall show the general dimensions, sizes and weights of all members and plates, and such other information as may be necessary to enable the Engineer to determine whether or not the proposal conforms with the specifications.

After award of contract, the Contractor shall furnish the Engineer complete detail shop drawings of the structure for approval.

Painting: Before leaving the shop all steel work shall receive one (1)coat of red lead and linseed oil. After erection and test, the outside of the structure shall then receive one (1) coat of primer and two (2) coats of aluminum paint. Inside shall receive two (2) coats of red lead and oil mixed in the proportions of 20 lbs. of red lead to one (1) gallon of oil.

Guarantee: The Contractor shall guarantee the tank against any defect in workmanship or material, and shall agree to make any repairs caused by such defects, which occur within a period of one year from date of acceptance.

Filter Gravel: The Contractor shall furnish and place in the filters filter gravel of the sizes and depth as called for and shown on the plans.

Gravel shall be rounded pebbles, screened from deposits of sandy nature and shall be free of splinters and flat pieces. It shall be of such hard material as will not disintegrate and shall be at least ninety-five (95%) per cent silica. No material obtained from hardpan or clay will be accepted. Gravel shall not contain any dirt, dust, clay or sand, or iron oxide coating.

When shaken in water, it must leave the water clean and clear. Specific gravity shall not be less than that of the filter sand.

The filter gravel shall be divided into six classes. The sizes specified are subject to change at the discretion of the Engineer.

CLASS 1 - Class one shall pass through a screen having a clear mesh of two and one-half (2-1/2) inches and be retained on a screen having a clear mesh of one (1) inch. The top of this layer shall be eight inches above the floor of the filter. In placing this layer only the largest size of this class shall be placed around the laterals in a manner such that openings in the laterals will not be obstructed.

CLASS 2 - Class two gravel shall be of such size as to pass through a screen having a clear mesh of one (1) inch and be retained on a screen having a clear mesh of 1/2 inch. The depth of this layer shall be three (3) inches.

CLASS 3 - Class three gravel shall be of such size as to pass through a screen having a clear mesh of 1/2-inch and be retained on a screen having a clear mesh of 1/4-inch. The depth of this layer shall be three (3) inches.

CLASS 4 - Class four gravel shall be of such size as to pass through a screen having a clear mesh of 1/4-inch and be retained on a screen having a clear mesh of 1/8-inch. The depth of this layer shall be two (2) inches.

CLASS 5 - Class five gravel shall be of such size as to pass through a screen having a clear mesh of 1/8-inch and be retained on a screen having a clear mesh of 1/12-inch. The depth of this layer shall be two (2) inches.

CLASS 6 - Class six shall consist of a layer of torpedo sand having an effective size of 0.8 to 1.2 mm and a uniformity coefficient of not more than 1.7. The depth of this layer shall be three (3) inches.

Delivery and Placing of Gravel: Especial care shall be taken in transporting and placing the gravel to prevent contamination and to prevent it from becoming dirty. Any gravel which may become dirty either before or after it has been placed in the filters, shall either be removed and washed or replaced with clean

gravel in a satisfactory manner. All gravel which has been contaminated, other than by dirt, will be rejected. The several layers of gravel shall be accurately placed to the required depths and each layer shall be smoothed off to a true surface. A large sample of the various sizes, showing the size and grading, must be submitted for approval.

Filter Sand: The Contractor shall furnish and place filter sand in each of the filters to the depth of twenty-seven (27) inches.

Quality of Sand: The filter sand shall be clean river, lake or bank sand, with either sharp or rounded grains, and shall not contain more than one (1) per cent by weight of flat or laminated particles. The sand grains shall be of hard material which will not disintegrate, and shall contain at least ninety-five (95%) per cent of silica calculated as SiO2. The sand shall contain not more than five-tenths (0.5) per cent of lime computed as calcium oxide and which is finer than thirty-six hundredths (0.36) of a millimeter, not more than one and five-tenths (1.5) per cent of iron, nor more than five-tenths (0.5) per cent of loam, clay and dust, and shall be entirely free from perishable matter. If necessary, the sand shall be washed and screened to produce filter sand of the proper quality and size.

Size: The filter sand shall have an effective size of not less than thirty-six hundredths (0.36) nor more than forty-four (0.44) hundredths of a millimeter and shall have a uniformity coefficient of not more than one and five-tenths (1.5); nor more than two-tenths (0.2) per cent by weight shall be finer than two-tenths (0.2) of a millimeter; not more than one (1) per cent shall be finer than twenty-five hundredths (0.25) of a millimeter; at least ninety (90) per cent by weight shall be finer than eight-tenths (0.8) of a millimeter; and practically all of the grains shall be finer than one (1) millimeter. The size of sand specified is subject to change at the discretion of the Engineer.

Testing: The Contractor shall furnish the Engineer a certified sieve analysis of each car of sand, made from composite samples taken by a laboratory,

approved by the Engineer of P.W.A., either at the point of manufacture or at the site of the work, and no sand may be placed in the filters until such certified analyses are received and approved by the Engineer.

Transporting and Placing: Especial care should be taken in transporting and placing the sand to prevent contamination and to prevent it from becoming dirty. Any sand which may have become dirty, either before or after it has been placed in the filters shall be either washed or removed and replaced by clean sand in a satisfactory manner. All sand which has been contaminated other than by dirt, will be rejected. In placing the sand in filters, great care shall be taken to avoid disturbing the upper layer of filter gravel. After the sand has been placed, it shall be washed at least ten (10) times by the washing devices connected with the filters. Each of these separate and distinct washings shall be of at least five (5) minutes duration, and the wash water shall be applied at the rate of fifteen (15) gallons per square foot per minute. The beds shall be scraped as required, to remove excess fine sand and objectionable material.

Uniformity of Sand Layer: Samples of sand taken from the sand layers, after the sand has been washed in place, shall meet the requirements for size heretofore specified. Sand not meeting these requirements for size will be rejected and shall be removed from the filters.

Pumping Equipment: The Contractor shall furnish and install the following pumping equipment:

1 - 3000 G.P.M., 1200 R.P.M., 322 foot total head horizontal centrifugal pump - gasoline engine drive

ALTERNATE:

1 -2100 G.P.M., 1200 R.P.M., 295 foot head horizontal centrifugal pump, gasoline engine drive.

To be installed in main pump room.

1 - 1500 G.P.M., 300 ft. head, horizontal centrifugal pump, driven by 2300 volt, 3-phase, 60 cycle, 1800 RPM Squirrel cage motor.

To be installed in main pump room

1 - 2100 G.P.M., 77 ft. total head, horizontal centrifugal pump, driven by 220 volt, 3-phase, 60 cycle, 1800 RPM squirrel cage motor.

To be installed in river pumping station

1 - 2500 G.P.M., 97 ft. total head, horizontal centrifugal pump driven by 220 volt, 3-phase, 60cycle, 1800 RPM, squirrel cage motor.

To be installed at the Sandy Creek Station.

Wash Water Pump - 300 G.P.M., 61 foot total head, driven by 220 volt, 3-phase,60 cycle, 1800 RPM squirrel cage motor.

Centrifugal Pumps: The centrifugal pumps shall be DeLaval, Goulds, Allis-Chalmers, or equal, make. The high service unit may be either single stages in series or multistage. In in series, series piping must pass above center line of shaft. All pumps shall be double suction type. Casing shall be of cast iron, split horizontally on the center line of the shaft. Bearings shall be of ring oiled type and of ample proportions to insure cool running and long life.

Impellers shall be of bronze, smoothly finished and accurately balanced to avoid vibration and shall be hydraulically balanced to avoid end thrust. Removable bronze wearing rings shall be provided at the joint between suction and discharge chambers on case and impeller. Shaft shall be of forged open hearth steel, shall be properly centered and ground over its entire surface; it shall be protected from corrosion and wear from the packing by removable bronze sleeves. Stuffing boxes shall be of ample depth, readily accessible and of approved design and shall be furnished with water seals where necessary. Glands shall be bronze or brass, designed for easy removal. Suction and discharge nozzles of pumps shall be located as shown on plans.

Gasoline Engine: The engine shall operate at a speed of 1200 R.P.M. and the compression pressure shall not exceed 70 pounds gauge at engine rating. High compression engines requiring anti-knock fuels, or which may require such fuels after brief running periods, owing to increase in compression, due to seating of rings or accumulation of carbon, are not acceptable.

The engine shall be 6-cylinder, rated 425 H.P., at 1200 R.P.M., bore 8", stroke 9". Crankshaft shall be drop forged from dies, material chrome nickel molydenum steel, heat treated, counter-weighted and dynamically balanced. Camshaft drop forged from dies with integral cams and bearings ground to accurate size. Handhole plates shall be provided on both sides of upper crankcase to permit inspection of the interior. Main bearings shall be carried in the upper crankcase, to facilitate replacement of lower half of bearing, and be accurately fitted without shims, and the bearing cap shall be anchored against side thrust. Oil shall be admitted to the inside of the main bearings in at least four places. Cylinders shall be cast enbloc with removable sleeves. Cylinder heads shall be cast in pairs with dual inlet and exhaust valves. Flywheel shall be a rolled steel forging flange bolted to crankshaft. Spark plugs shall be located in cylinder heads and not in sidewalls. Pistons shall be of the small expansion ratio type allowing the engine to assume full load immediately upon starting. Connecting rods shall have a length at least twice that of the piston stroke to minimize side thrust.

A governor shall be provided in combination with the throttle valve to provide speed regulation within 3 per cent plus or minus from full load to no load. Ignition system shall consist of two 12 volt batteries, 12 volt starters and generator, two double independent battery timers with heavy coils firing four spark plugs per cylinder. One battery charger shall be furnished and shall be 110 volt, 60 cycle, with insulated transformer for direct connection to a grounded battery and shall be provided with selector for charging

at the rates of 6 and 12 amperes. Oil shall be supplied under pressure to main bearings, connecting rod bearings, camshaft and timing gears. An oil cooler and filter shall cool all of the oil. The engine is to be provided with a hand fuel pump and engine driven diaphragm type pump. A one gallon tank with two-quart overflow shall be provided in connection with a 500 gallon, 12 gauge underground storage tank. A gasoline strainer is to be located in the fuel line at the lowers point and made accessible for cleaning. Muffler desired is the wet type silencer of 8" size. Fuel vent pipes shall be carried to a point above the roof and provided with vent caps and flame arresters.

Gasoline tank shall be provided with a gasoline gauge of the dial type for mounting in the engine room, and Contractor will furnish the complete unit, including float and actuating device, cable and conduit. The engine builder shall furnish schematic piping layout.

The flexible coupling for connecting the engine and pump shall be enclosed within the flywheel housing.

Engine for alternate unit shall conform in general with these specifications except as to stroke and bore.

TESTS: Engine shall be tested out at the works of the manufacturer for not less than 35 hours/or until capable of assuming full load. In order to assure a safe margin of speed and to guarantee that the engine is not operated at its maximum speed, it shall be operated in the presence of an inspector for 10 hours at 5 per cent overload at 1200 R.P.M. or higher.

The engine and all details of the installation shall have the full approval of the National Board of Fire Underwriters for Municipal standby service.

Each bid shall be accompanied with a catalog of the engine and a list of installations. The Contractor shall furnish and install all connections required.

Priming, Drain and Gauge Lines: Furnish and install priming lines as shown in the main pump room and the river pumping station and connect existing primer at Sandy Creek station to new pump. Install all drip and drain connections and gauge lines required for all pumps.

Motors: All motors shall be G.E. Company, Westinghouse, or equal, 3-phase, 60 cycle, 40°C squirrel cage induction motors, suitable for operating conditions specified. The Contractor shall furnish and install compensators for starting.

Foundations: Concrete foundations will be furnished by the Owner but the Contractor must set all anchor bolts and be responsible for their proper alignment. After the pumps are set and properly aligned, the Contractor shall grout the units in place.

Pipe Connections: In no case shall the suction and discharge connections to the pumps be installed until the bed plate grout has set sufficiently to prevent any movement and special care shall be exercised when making the pipe connections to prevent any strain that might cause the pump and motor bearings to be thrown out of alignment. The coupling bolts between pump and motor shall not be installed until the final alignment has been approved by the Engineer.

Removal of Present Pumps: After the new high service pump has been placed and the plant is operating, the Contractor shall remove the present 1200 G.P.M. high service pump from the old station and install it in the new station at location #3. When this pump is operating, he shall move the present 3000 G.P.M. high service unit, convert it from left hand to right hand and install it at location #2. All connections and all valves shall be furnished and installed as for the new unit.

Test and Guarantee: The Contractor is required to guarantee capacity, head and efficiency and to furnish characteristic curves showing the guaranteed relation between them, with his proposal.

Upon completion of the units at the factory, the manufacturer must

test the units and must furnish the Engineer with the test data properly witnessed and certified to by a recognized testing laboratory acceptable to the Engineer, and unless the guarantees made with his bid are equalled or exceeded by the tests, the units will not be accepted and the Contractor will be required to furnish other equipment satisfactory to the Owner.

Efficiencies: Pumps having less than the following efficiencies will not be considered:

	3000 GPM - 322 ft. total head	84 per cent
Alternate:	2000 GPM - 295 foot total head	81 per cent
	1500 GPM - 300 foot total head	77 per cent
	2500 GPM - 97 foot total head	86 per cent
	2100 GPM - 77 foot total head	83 per cent

At the design head, motors shall be so proportioned that the brake horsepower required by the pump will be not more than 5 per cent above name plate rating and at lower points on the head curve overload shall not be more than 15 per cent above name plate rating.

Separate bids will be received on the pumping equipment installed. Should the Owner find it necessary to eliminate one or more of these units to reduce the cost of the project, the right is reserved to deduct the cost of such units from the lump sum bid.

Crane: The Contractor shall furnish and install a crane and crane runway as shown on plans. The Owner will set U bolt, or other connection furnished by the Contractor, required in the concrete. The crane shall be a three ton Morris type 36, or equal, with Army Type Chain Hoist.

Cast Iron Pipe Lines in Place: The Owner, in constructing the concrete work, has placed all cast iron drainage pipe in the Sedimentation Basins to points just outside the structure, and the two influent lines from the Sedimentation Basins to the filter gallery, incased in concrete, together with inlet, outlet and drain connections for the clear water well. These lines are shown as shaded on the plans and should not be included by the Contractor in his proposal.

Cast Iron Pipe Outside the Structures: The Contractor shall furnish and lay all cast iron pipe shown on the plans. Classes shall be as previously specified.

Proper and suitable tools and appliances shall be used in handling pipe, and special care shall be taken to prevent damage to the pipe coating. All pieces shall be carefully examined for defects, and no pipe shall be laid which is known to be defective. If any defective piece should be discovered after being laid, it shall be removed and replaced with sound material, in a satisfactory manner, by the Contractor and at his expense.

All pipes shall be thoroughly cleaned before laying, and shall be kept clean until they are accepted in the completed work, and when laid shall accurately conform with the lines, grades or directions given by the Engineer.

Pipe shall be carefully bedded to have a uniform support throughout its length. All points of rock or other material apt to injure the coating must be removed. Where pipe is laid in rock trench, the rock shall first be covered by two or three inches of earth to prevent the pipe coming in direct contact with the rock and to provide an even bearing. All pipe wherefoundation is not satisfactory must be supported on blocking and wedges to hold it in the position intended. Two (2) supports shall be used, both well bedded into the bottom of trench; one shall be placed at the spigot and the other back of the bell. After laying, the pipe shall be carefully bedded in earth well tamped into place.

All specials and valves shall be carefully supported on blocking, as directed by the Engineer. All backfilling material within one foot of the pipe must not contain stones or other material which might injure the coating.

Uniform space must be provided for caulking around all spigots. No joint at any curve shall be so compressed as to reduce the caulking space to less than one-quarter (1/4) inch.

Gaskets shall be of clean, sound, hemp yarn, braided or twisted, and

shall be firmly and evenly caulked into place at the bottom of the bell. The lead space shall be one and three-fourth (1-3/4) inches deep. All joints must be dry and wiped clean before running the lead.

The best quality of soft pig lead, satisfactory to the Engineer, shall be used in caulking. All joints shall be run full at one pouring. The lead pot must be kept within easy reach of the work to be poured. Any joint not run full at the first pouring must be removed. A suitable torch for this purpose shall be maintained on the work. No fires will be permitted to be built around any joint.

Only competent and experienced mechanics shall be employed to do any caulking work. All joints must be tight, and the bell must not be over-strained. Lead shall be flush with the face of the bell after caulking. No cold plugs, lead-wool, or other material will be permitted to fill any cavities. In such cases the joint must be melted out and repoured at the Contractor's expense.

Testing Pipe Lines: All pipe lines shall be subjected to an Hydrostatic Test at a pressure 50 lbs. in excess of the working pressure. The test shall be made by closing off a section and applying the test pressure by means of a test pump. The test pressure shall be maintained for a period of two hours and the water required to maintain the pressure shall be measured. The leakage shall not exceed 50 gallons per inch of diameter per mile of pipe, per 24 hours. If the leakage exceeds this amount, the line will not be accepted.

Rock Excavation: All material which is classified as rock shall be paid for in addition to the price bid per linear foot for laying pipe. The Contractor, or his representative, must check up with the Engineer all lines and dimensions for the computation of rock quantities. His failure to do so shall make the Engineer's measurements and determinations on rock volume final and binding for payment, and shall be considered as an acceptance by the Contractor. If the Contractor does not agree with the Engineer in his measurements, he must so

notify him in writing within three days. Failure to do this shall be considered an acceptance of the Engineer's measurements and shall be considered final and binding for purposes of estimate and payment.

The unit to be used for payment for rock excavation shall be one linear foot of trench one foot in depth.

Quantities: The quantities given in the proposal sheet are for pipe lines outside the structures and shall be used in computing the lump sum bid. Should it be necessary to reduce the amount of pipe tto reduce project cost or should the actual quantities of pipe or rock required be greater or less than those given in the proposal, a corresponding addition or deduction will be made in the lump sum bid.

Strapping Pipe: Wherever necessary, the Contractor shall strap or block pipe securely in place to prevent it blowing off under pressure. This applies to pipe both inside and outside the structures.

Should any joints blow off or leak during the 30-day test period, the Contractor shall make the necessary repairs and provide such permanent bracing as may be necessary.

Painting: Upon completion of the work, the Contractor shall paint all exposed piping, pumps, valves, conduits and all other metal work with two coats of paint of quality and color approved by the Engineer.

Sump Pumps: The Contractor shall furnish all materials and install an electrically driven sump pump in the river station and in Sandy Creek Station, as shown on plans. Furnish and install all necessary wiring.

Laboratory Equipment: The Contractor shall furnish all chemical and bacteriological equipment for the laboratory. The Contractor shall set asside $750.00 in his lump sum bid for the purchase of this equipment. List to be furnished later.

Power Wiring: The Owner will furnish and install transformer station lighting arresters and transformers at all stations. The Contractor shall run all cable

and conduit from the low side of transformers and shall install switchboard, switchgear and all other work necessary to place power equipment requiring 2300 volts, or 220 volts in operation.

The incoming lines at the filter plant shall run overhead to the building from the transformer station and shall be conveyed to the switchboard in conduit laid in wall beam along north side of building to a point opposite the panels and in laboratory floor to switch room. Suitable potheads shall be used for terminals.

Main Switch Panels: The Contractor shall furnish and erect in the pump room one 2300 volt, 3-phase, 60 cycle, power panel and one 220 volt, 3-phase, 60 cycle panel, of steel construction, dull black finish. The panels shall be arranged and provided with the necessary instruments and attachments as follows:

2300 Volt Panel:

1 - Volt meter, indicating 0-3000 volt scale - Horizontal edgewise instruments.

1 - Ammeter, indicating 0-300 Ampere scale - Horizontal edgewise instrument.

1 - Volt meter switch for reading three phase

1 - Ammeter switch - three way

1 - Integrating Watthour meter with indicating demand attachment - G. E. - D.S.M. 19

All necessary current potential transformers and inter-connected panel wiring shall be furnished and installed.

Space shall be provided for one Recording Volt meter, furnished by Owner, The Contractor shall mount and connect this meter.

1 - 200 Ampere, 5000 volt, maximum T.P.S. oil circuit breaker, mounted on back of panel, with two-coil secondary trip, manually operated mechanism - G.E. Type F.K. 33.

Card holders for above equipment. Provide test receptacles for this panel.

220 Volt Panel:

1 - Watthour meter - G.E. Type DSM 19.

1 - Panel mounted air circuit breaker for Dry Feed Machines circuit - G. E. Type AF-1, 3 pole, 250 volts, 3 HP maximum load.

1 - Panel mounted air circuit breaker for Mechanical Mixer circuit - G.E. Type AF-1, 3 pole, 250 volts, 5 HP maximum load.

1 - Push button station for Wash Water Pump, stop and start, G.E. Type CR - 2940, panel mounted flush.

Disconnect Switches and Capacitor: The Contractor shall furnish and install four (4) sets disconnect switches and Capacitor as shown on plans.

Motor Controls: The motor for the Wash Water Pump is to be controlled by a magnetic switch, G.E. CR-7006, mounted on wall of stairway closet, with two push button stations as shown.

The Owner will furnish the starting equipment for Pumps No. 2 and 3. The Contractor shall remove the same from the present pump house to the locations shown and connect the motors as shown. The Contractor shall furnish and install all necessary wiring, conduits and miscellaneous electrical equipment as shown for the Oconee River Pumping Station, Sandy Creek Pump and No. 4 pump in main pump room.

Switch Room: As shown on the plans, the Contractor for Section No. 2 shall furnish and install the necessary grill work and door.

Wiring: All wire rubber covered for the 2300 volt circuit shall be insulated for 3500 volt; for the 220 volt circuits, for 600 volts. All 3-phase circuits run in conduit shall be lead covered. All wire run in open to be rubber covered, braided. All condulets and potheads terminating circuits of lead covered wire to be sealed with pothead compound. All taped joints to be painted with two coats of rubber insulating varnish. All conduits of main switchboard and pump motors to be grounded to water pipes with proper groundulets. All wires run in conduits in walls or floor to be rubber covered, lead covered. All conduit connections from stiff steel conduits above floor to

conduit boxes on motors shall be Sprague, or equal, galvanized, flexible steel conduit with proper connections.

Materials and Workmanship: All materials and workmanship shall be of the best quality and all work shall be done in a thorough manner and in strict accordance with the rules and requirements of the National Board of Underwriters, and with local regulations. All wiring shall be run in conduit and concealed in floors or partitions as much as possible. No electrical device or material of any kind shall be used that is not approved by the Underwriters' National Electric Association, and all articles shall have the name or trade mark of the manufacturer and the rating in volts and amperes, or other units, marked where they may be readily observed after the device is installed. Upon completion, the Contractor shall obtain and furnish to the Owner a satisfactory certificate of inspection from the proper authorities. The Contractor for this section shall submit for approval a complete set of working drawings showing the wiring of and the arrangement he proposes to use in the switchroom and the make of equipment he proposes to furnish. On these drawings he shall show the structural details of the switchroom grill and switchboard mounting.